

1

2

3 (*R,R*)

4 R = H
5 R = TBS

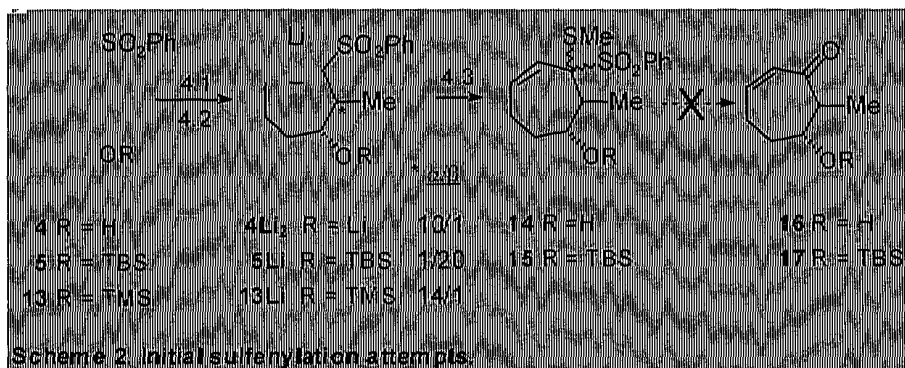
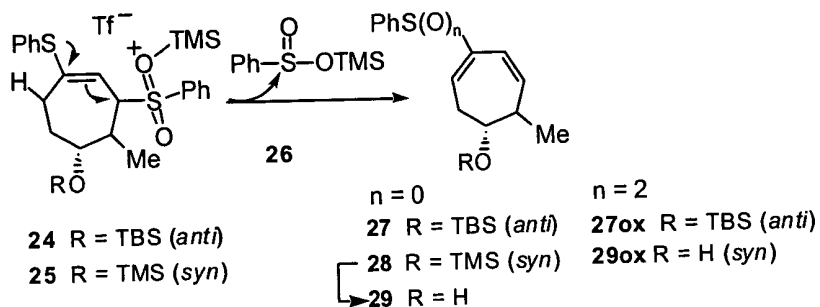
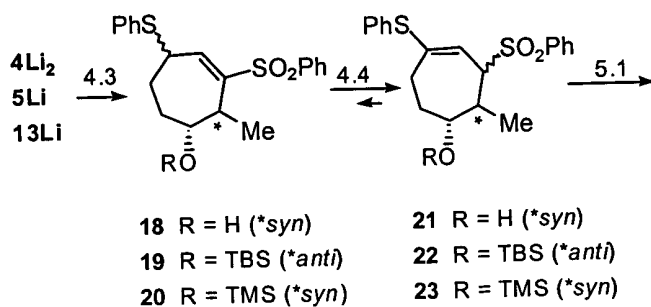
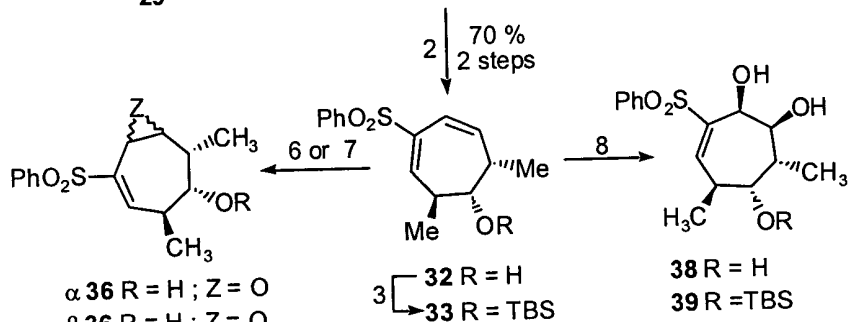
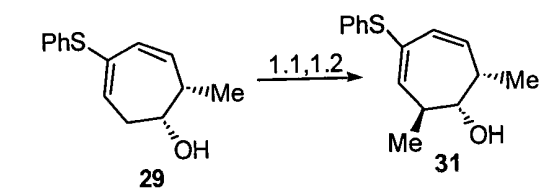
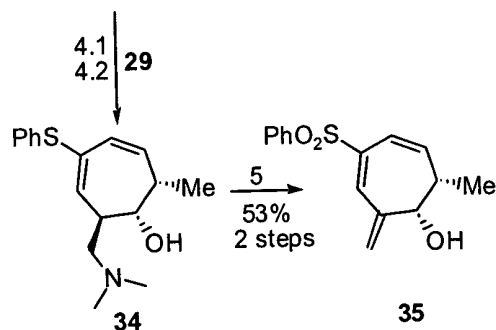
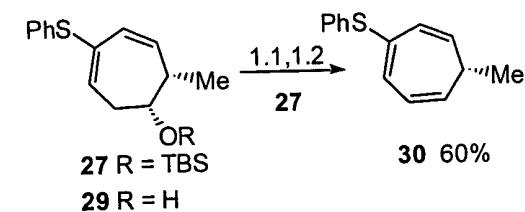


FIGURE 2



Scheme 3. Novel gamma sulfonylation and diene transposition.

FIGURE 3



α 36 R = H ; Z = O
 β 36 R = H ; Z = O
 α 37 R = TBS; Z = O
 β 37 R = TBS; Z = O

Scheme 4. Preparation of stereopentad progenitors.

1.1 *n*-BuLi (2.2 eq), THF, -78°C to -7°C, 1.2 MeI (5 eq), -90°C to -50°C; 2 *m*-CPBA (2.2 eq); CH₂Cl₂, 25°C, 30 min; 3 TBSOTf (1.2 eq), Lutidine (2 eq). CH₂Cl₂, 25°C, 2h; 4.1 *n*-BuLi (2.2eq), THF, -78°C to -5°C, 90 min; 4.2 Eschenmoser's salt (2.5 eq), THF, -70°C to 0°C, 1.5 h; 5 *m*-CPBA (4 eq); CH₂Cl₂, 25°C, 1h; 6 TBHP + 5% Mo(CO)₆, 88% >15:1 α/β ; 7 10% (*R,R*)-Mn(salen)Cl, H₂O₂, 1eq NH₄OAc, 83% 1:>20 α/β , 8 OsO₄ cat. >80%, single diastereomer

FIGURE 4

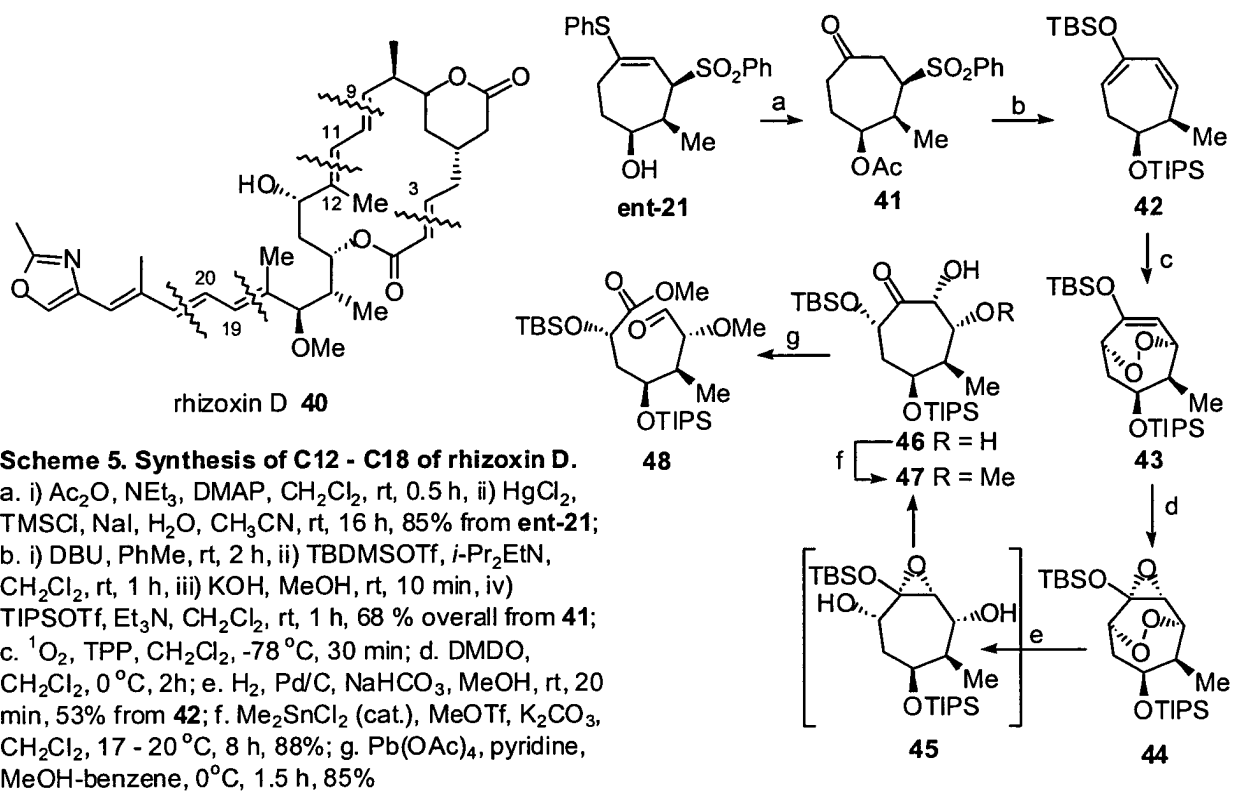
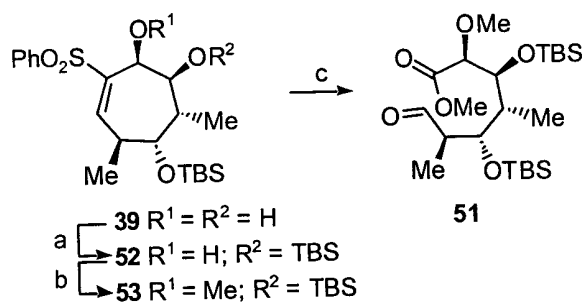
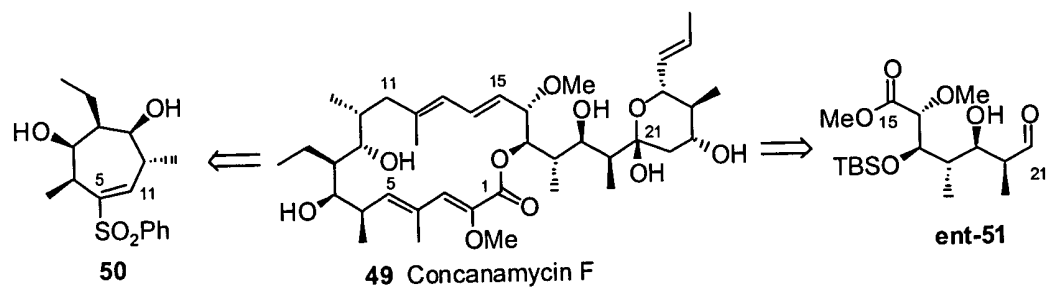


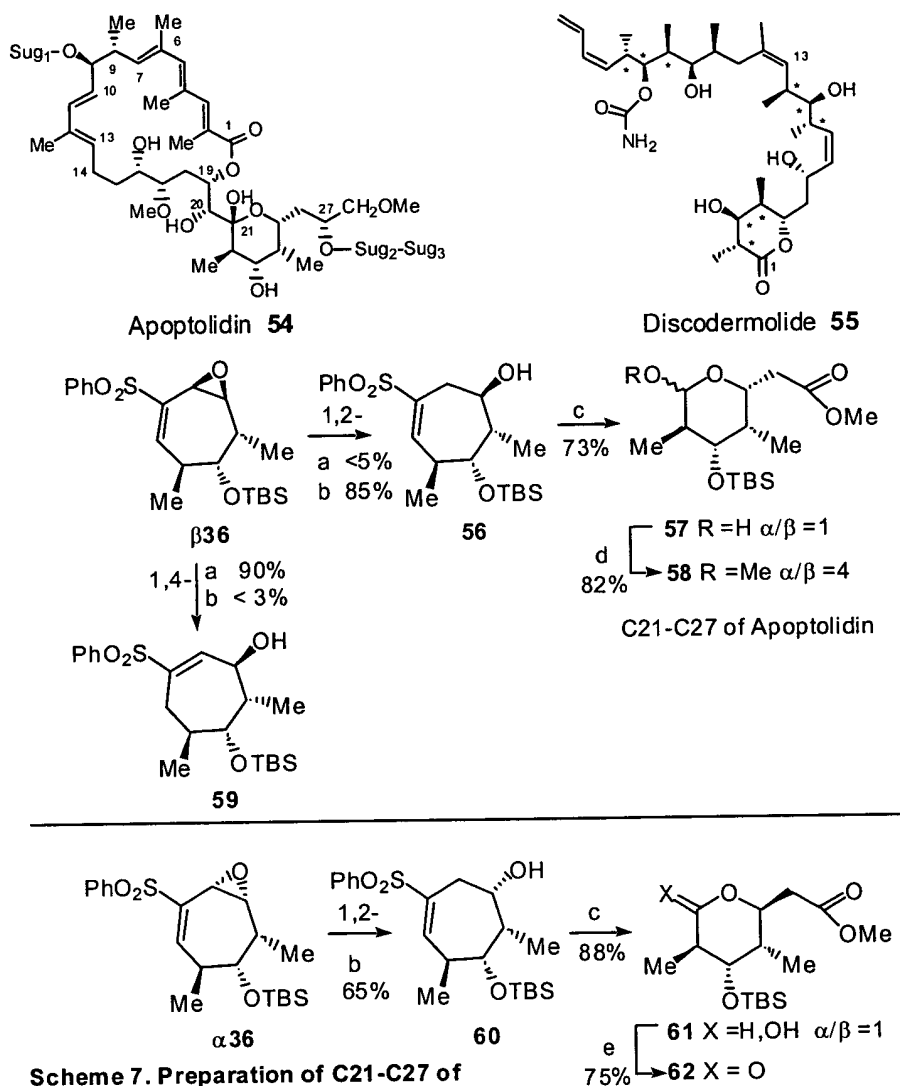
FIGURE 5



Scheme 6. Synthesis of the ent-C15-C21 fragment of Concanamycin F.

a TBSOTf, 2,6-Lutidine, CH_2Cl_2 , $-78^\circ C$, 24h, 99% ; b KOH/Mel/DMSO, $25^\circ C$, 5 min; 94%; c O_3 , CH_2Cl_2 , MeOH (1:2), $NaHCO_3$, $-78^\circ C$, 5 min, then PPh_3 , 92%

FIGURE 6



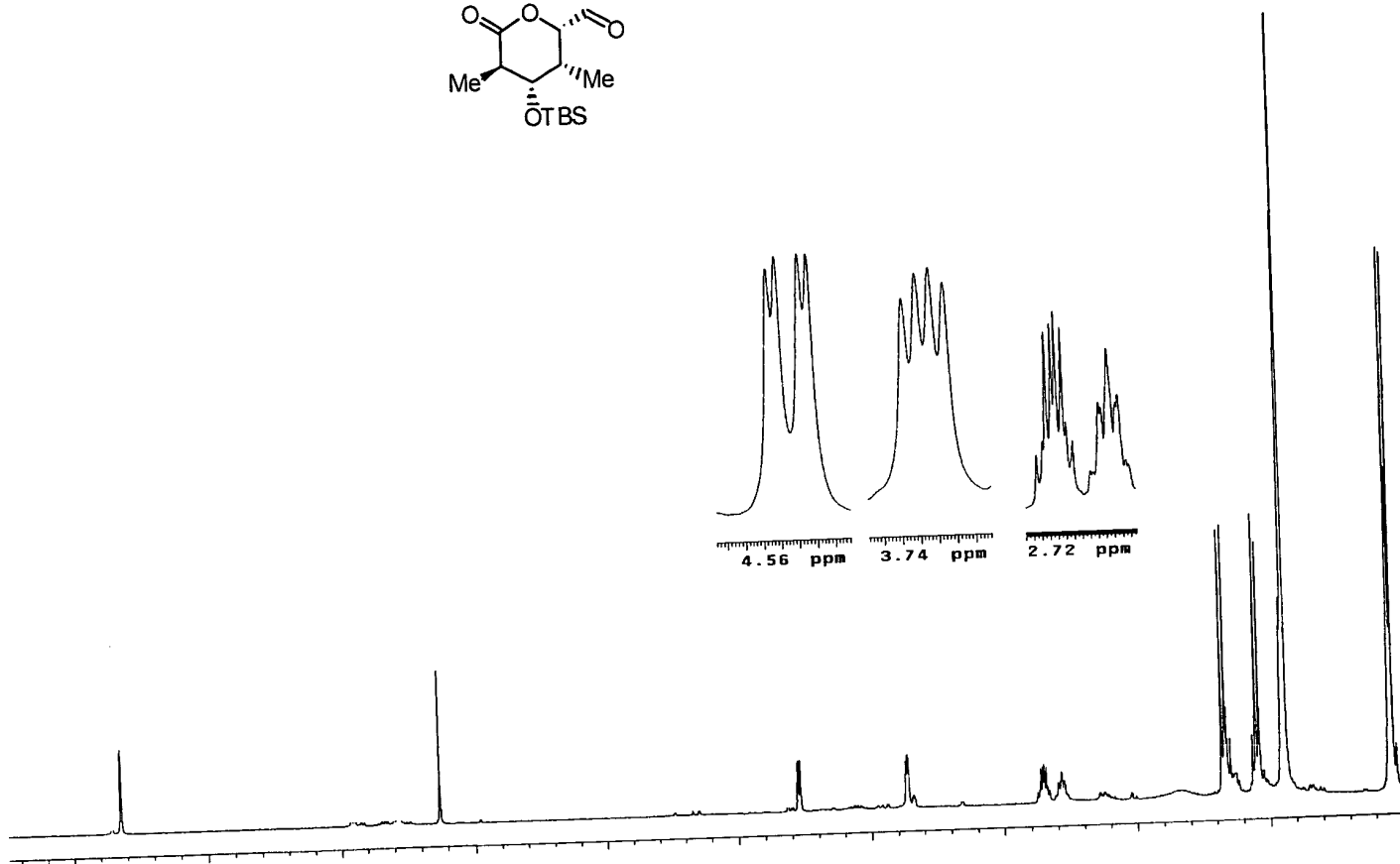
Scheme 7. Preparation of C21-C27 of Apoptolidin and C1-C7 of Discodermolide.

a $\text{BH}_3 \cdot \text{THF}$ (1.6 eq), THF, 0°C , warm to 25°C , 12 h;
 b 1.5 eq DIBAL-H, -78°C ; c O_3 , $\text{CH}_2\text{Cl}_2/\text{MeOH}$ (1:2), NaHCO_3 , -78°C , 5 min; d Ag_2O , MeI, CH_3CN , reflux, 3h; e PDC (5 eq), CH_2Cl_2 , 25°C , 10 h

FIGURE 7

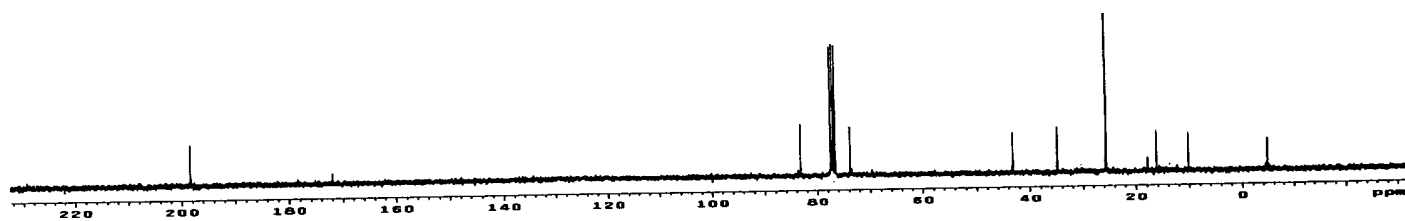
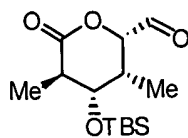
Figure 1. Evaluation and importance of the sulfur atom for this synthesis.



C[C@H]1C[C@@H](C)[C@H](OC(=O)C)[C@@H](OC(=O)C)[C@@H]1OC(=O)C

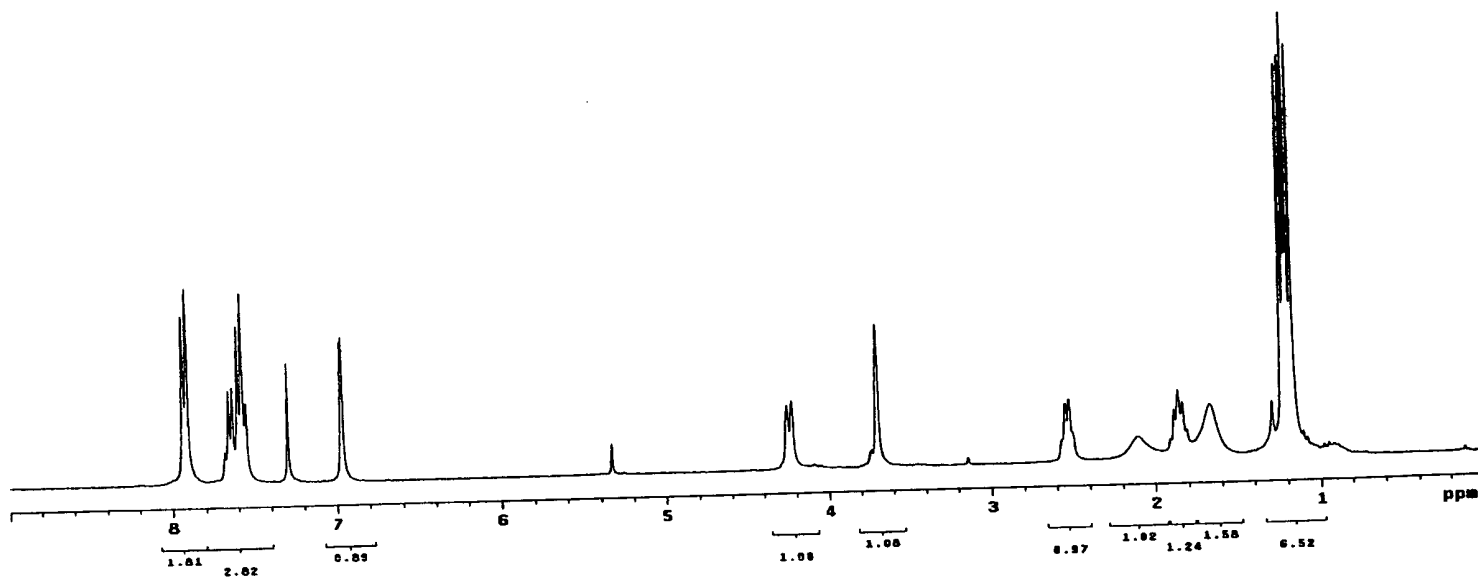
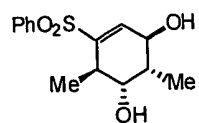
300MHz ¹H NMR of compound **22** in CDCl₃

FIGURE 8 (Cont'd)



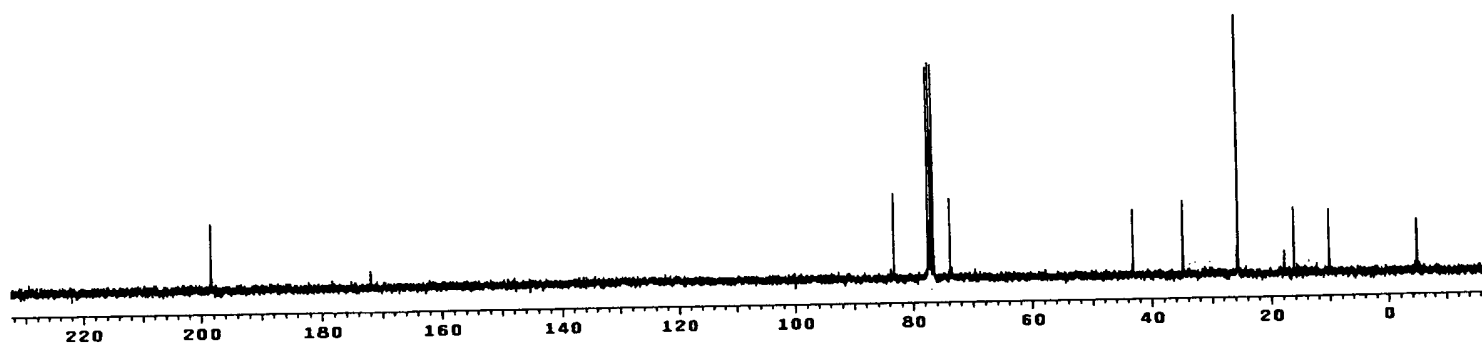
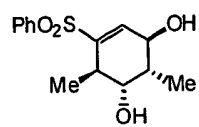
75MHz ^{13}C NMR of compound **22** in CDCl_3

FIGURE 8 (Cont'd)



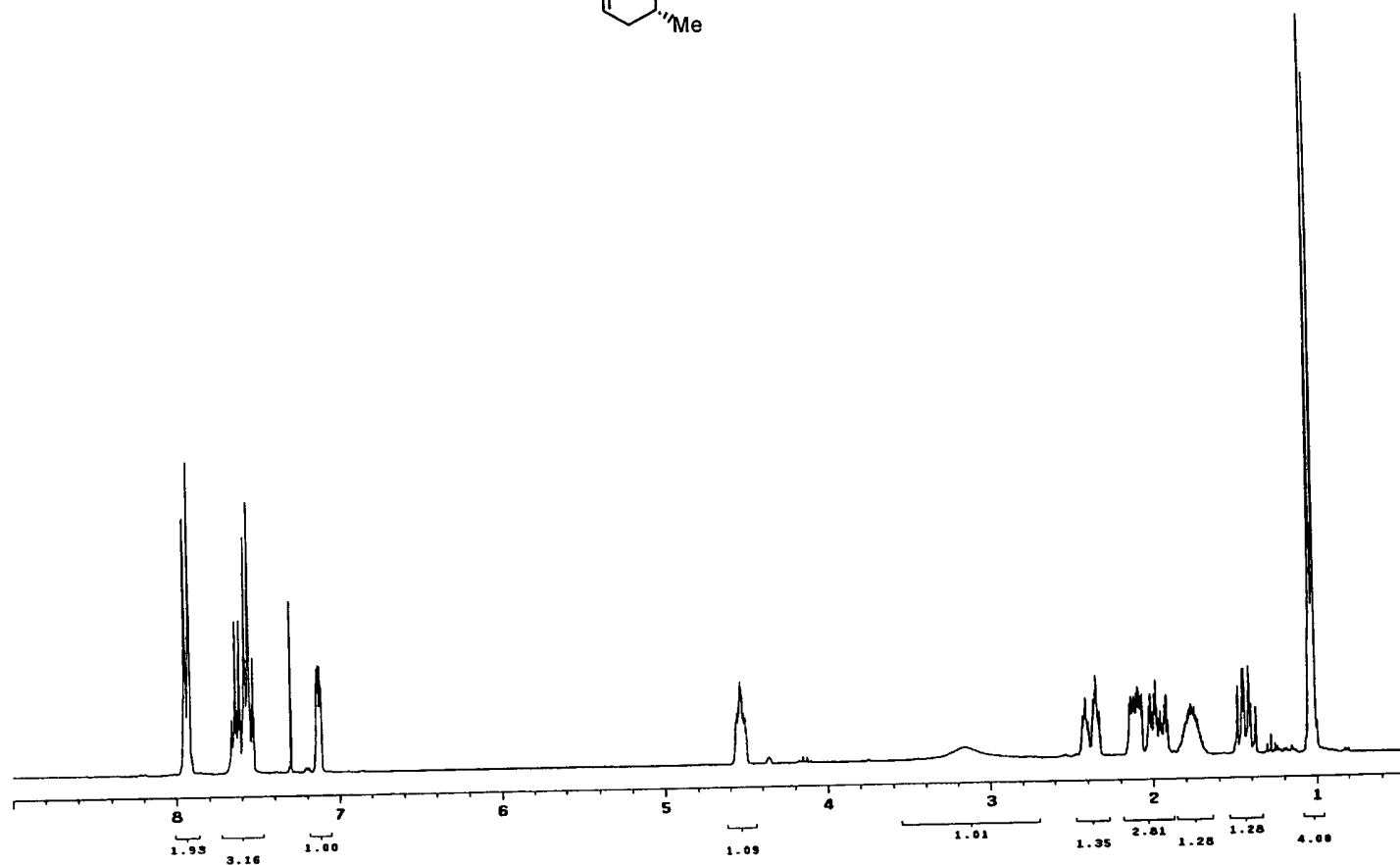
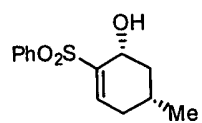
300MHz ^1H NMR of compound **23** in CDCl_3

FIGURE 8 (Cont'd)



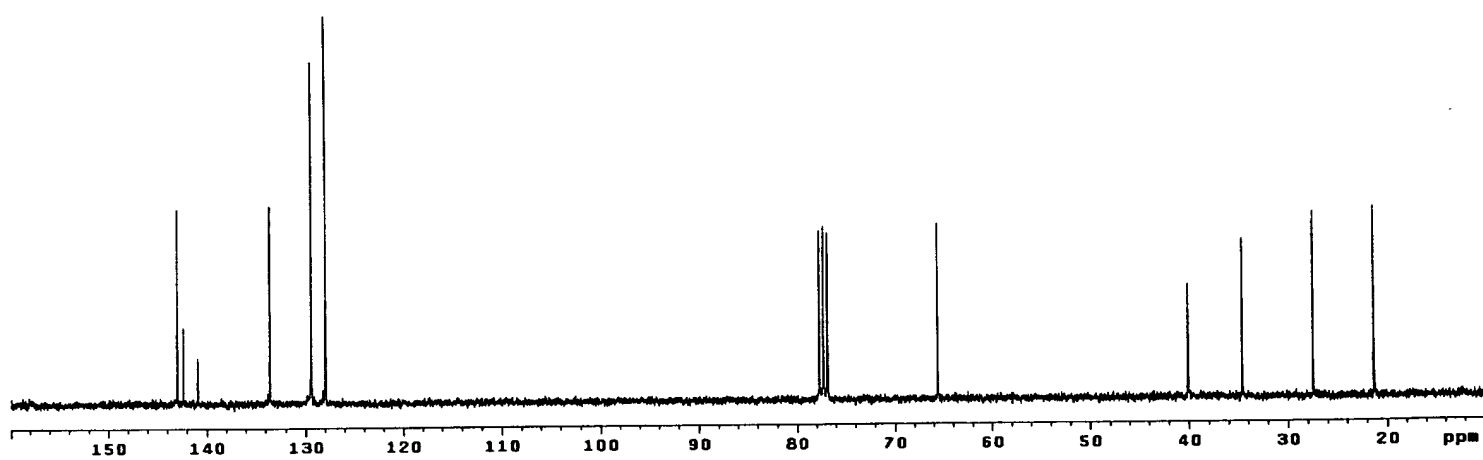
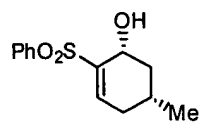
75MHz ^{13}C NMR of compound **23** in CDCl_3

FIGURE 8 (Cont'd)



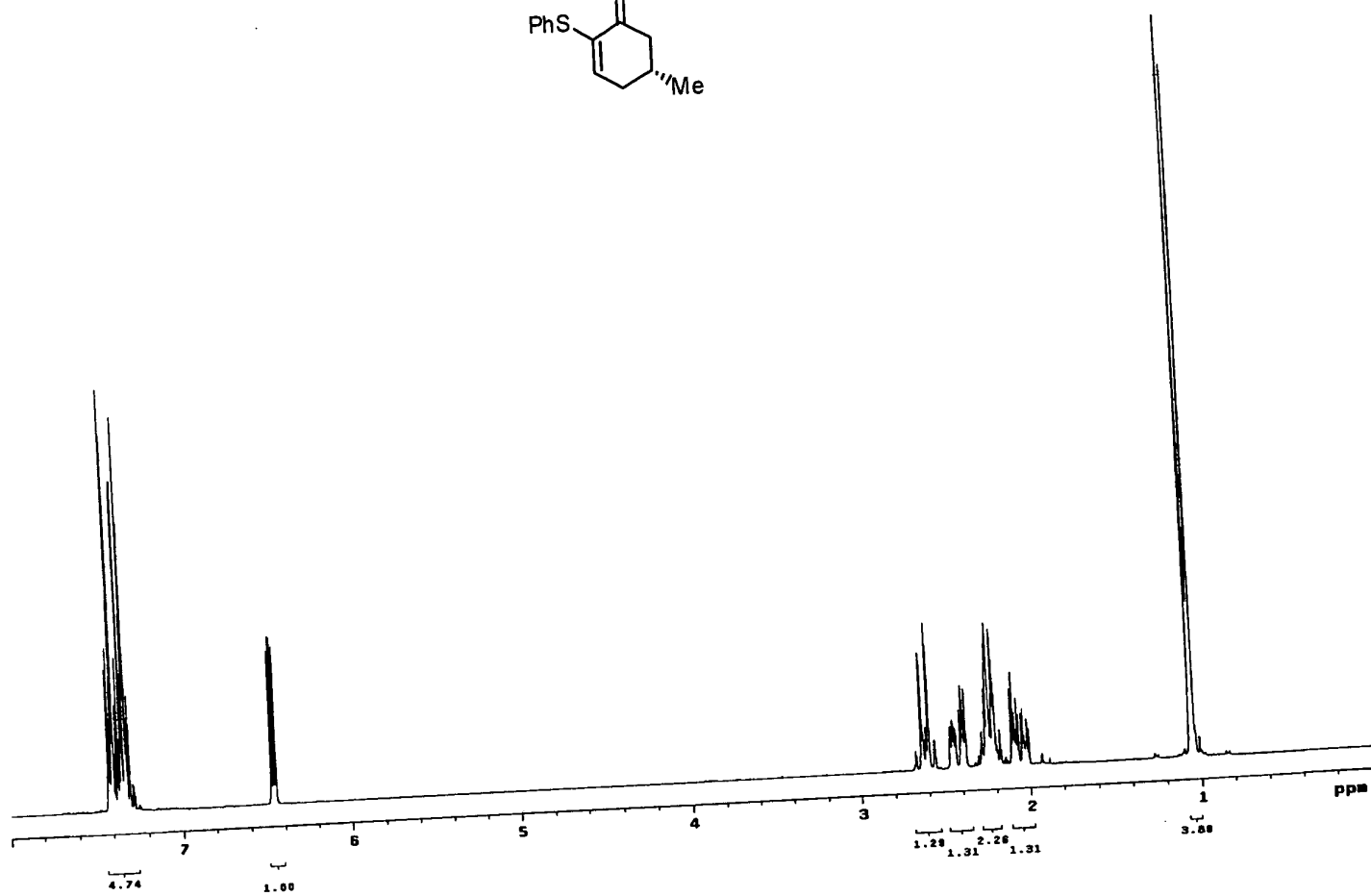
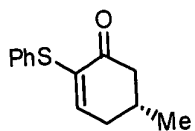
300MHz ¹H NMR of compound 24 in CDCl₃

FIGURE 8 (Cont'd)



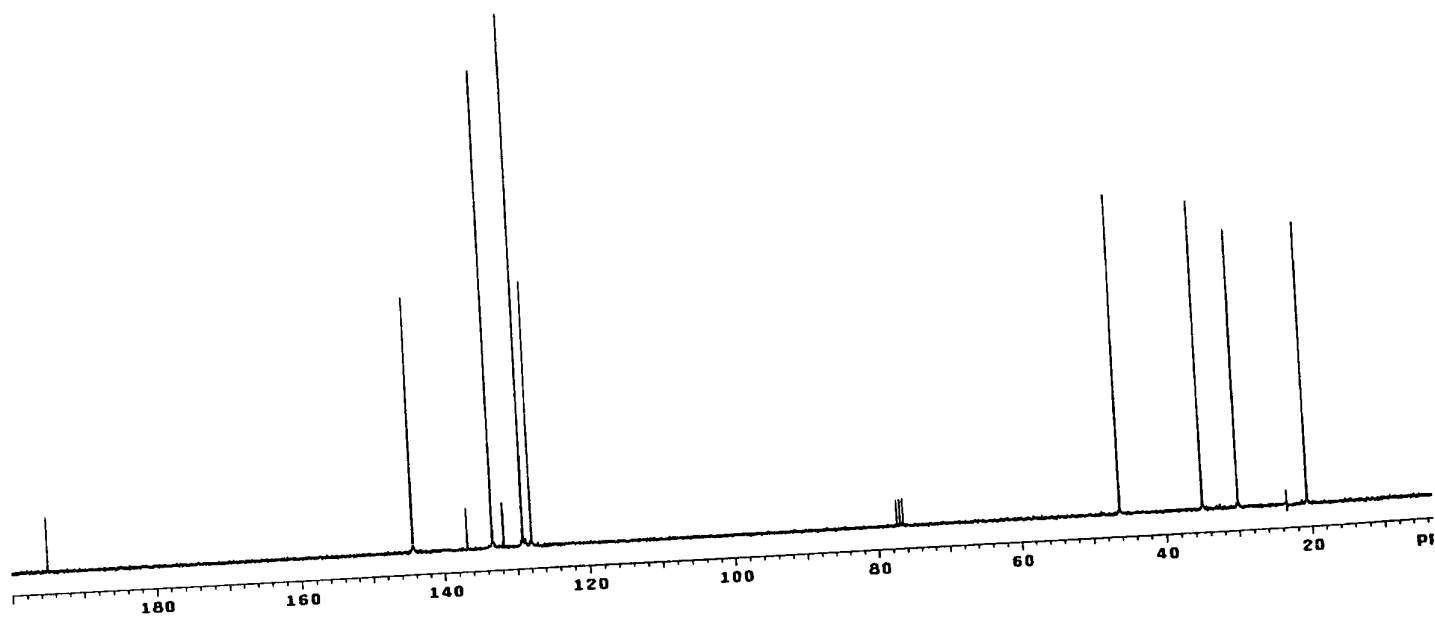
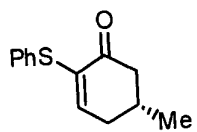
75MHz ¹³C NMR of compound 24 in CDCl₃

FIGURE 8 (Cont'd)



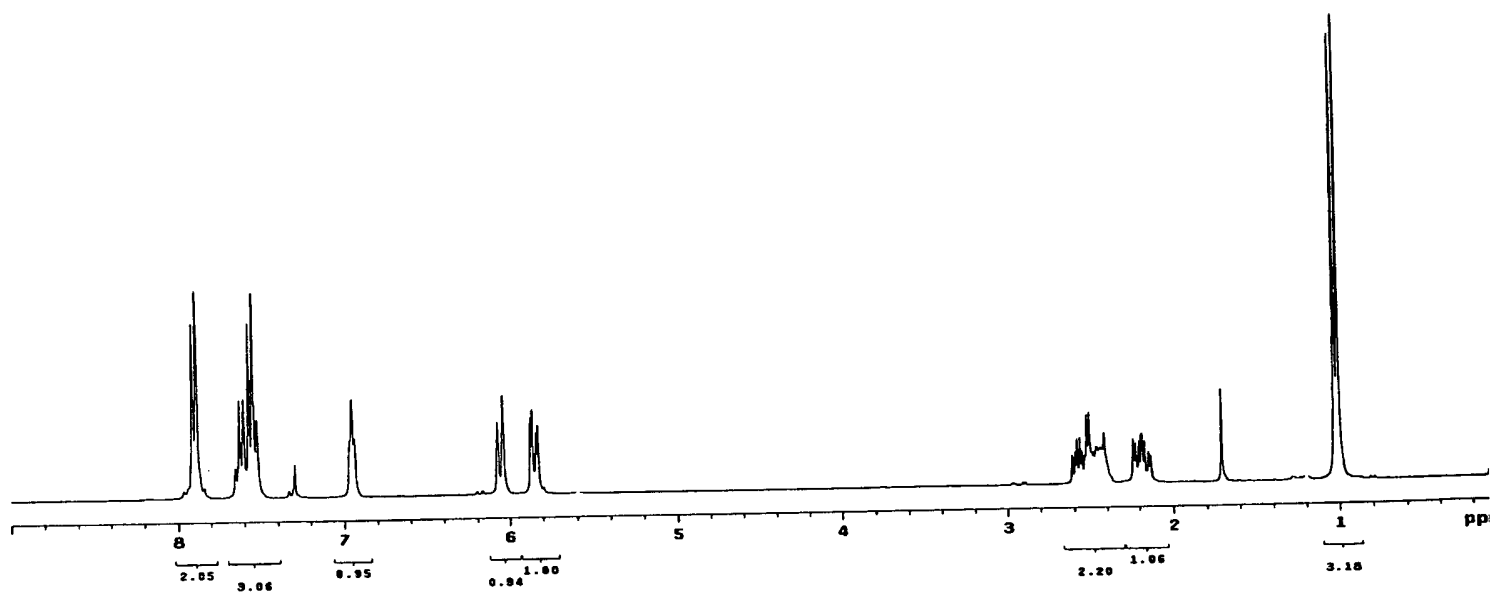
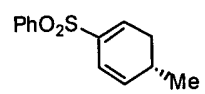
300MHz ¹H NMR of compound 28 in CDCl₃

FIGURE 8 (Cont'd)



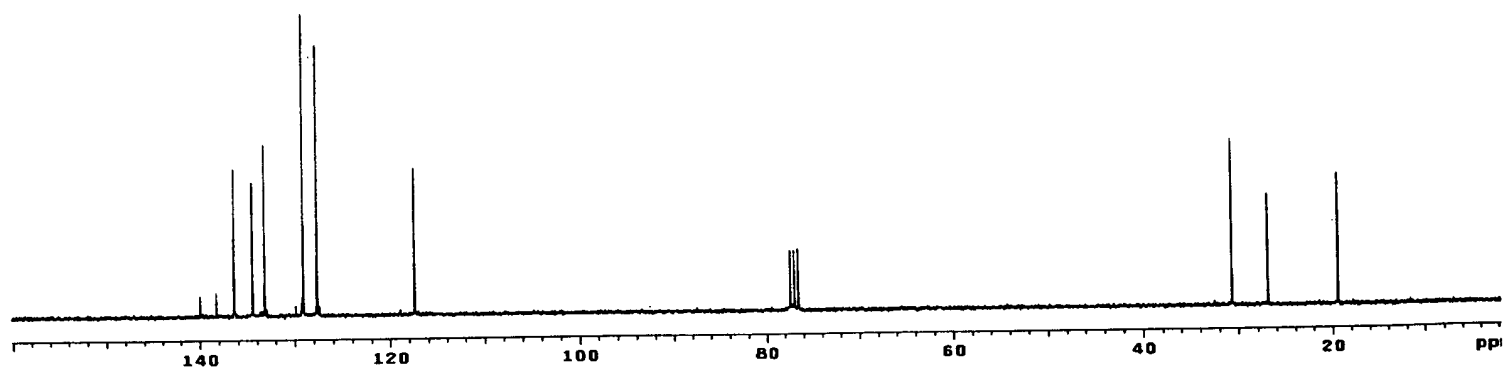
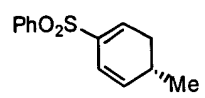
75MHz ^{13}C NMR of compound 28 in CDCl_3

FIGURE 8 (Cont'd)



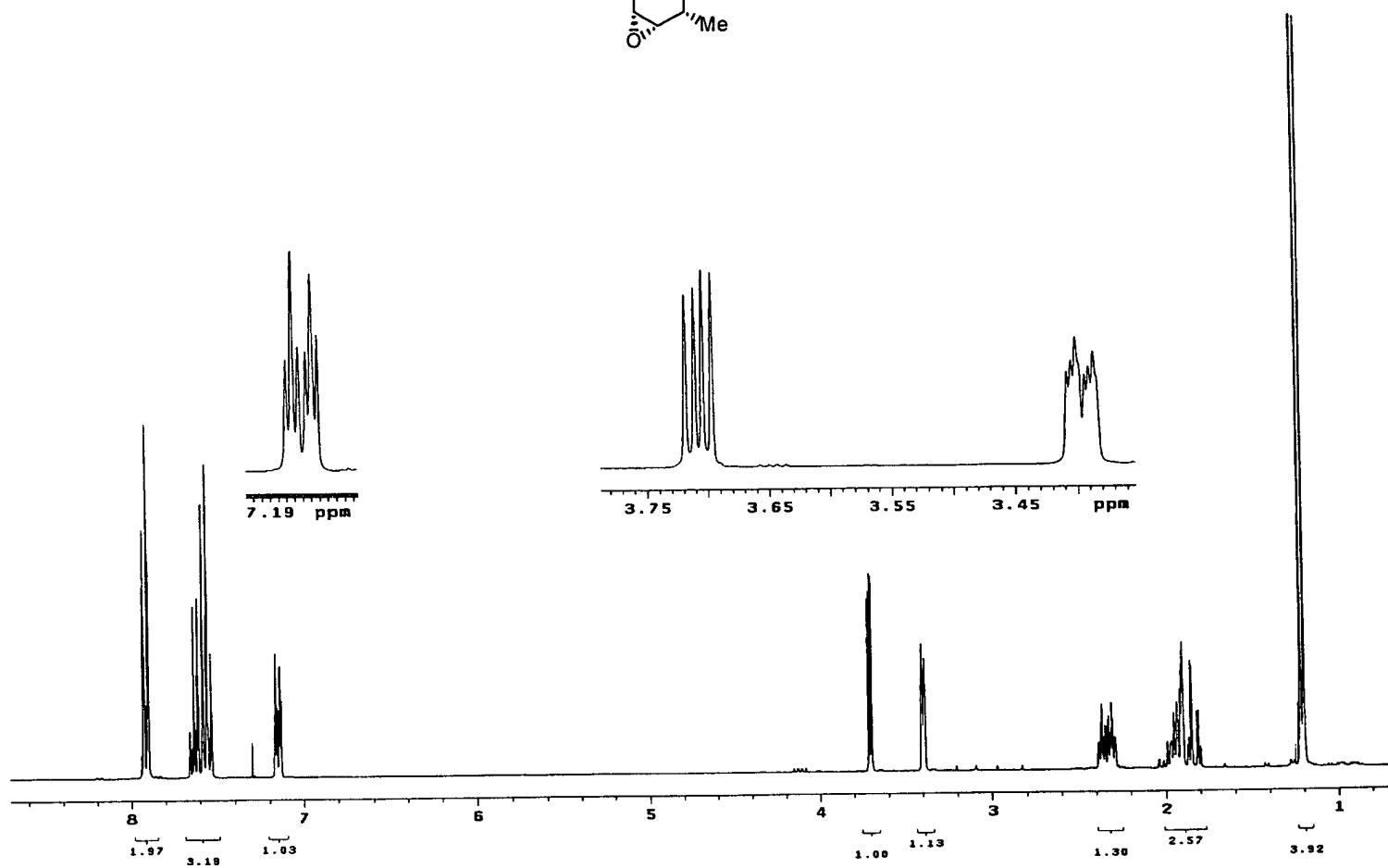
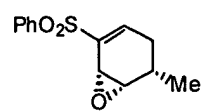
300MHz ^1H NMR of compound 29 in CDCl_3

FIGURE 8 (Cont'd)



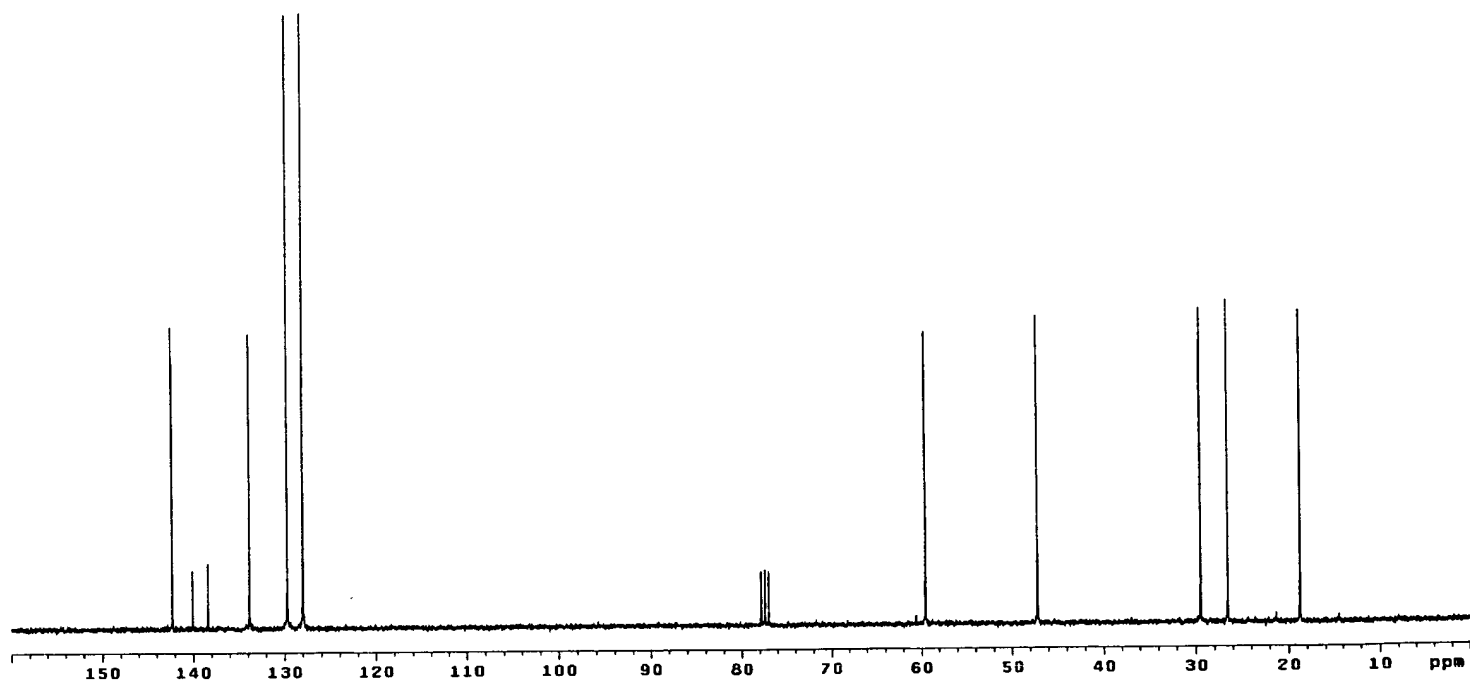
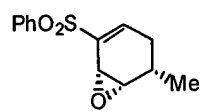
75MHz ^{13}C NMR of compound **29** in CDCl_3

FIGURE 8 (Cont'd)



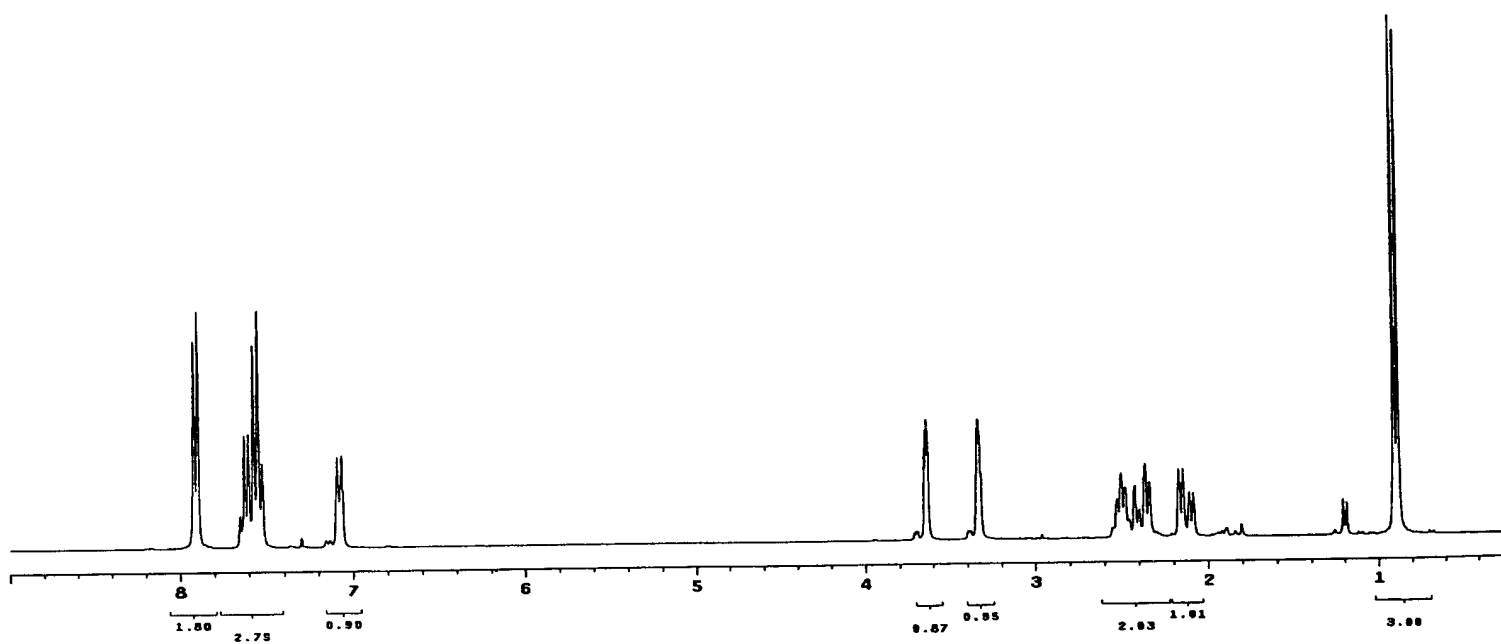
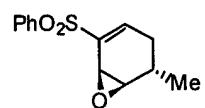
300MHz ^1H NMR of compound **30** in CDCl_3

FIGURE 8 (Cont'd)



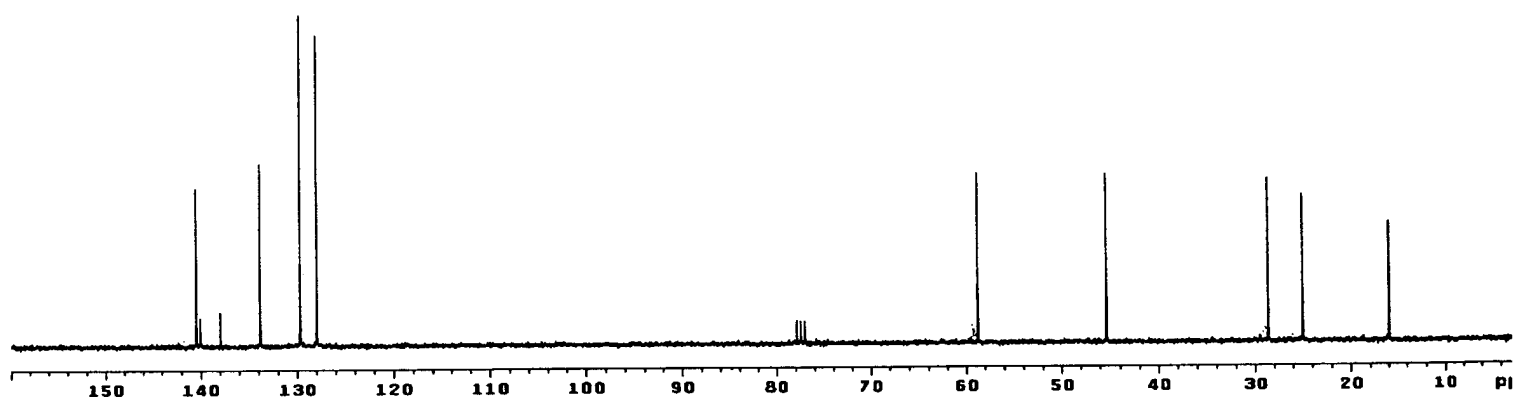
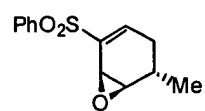
75MHz ^{13}C NMR of compound **30** in CDCl_3

FIGURE 8 (Cont'd)



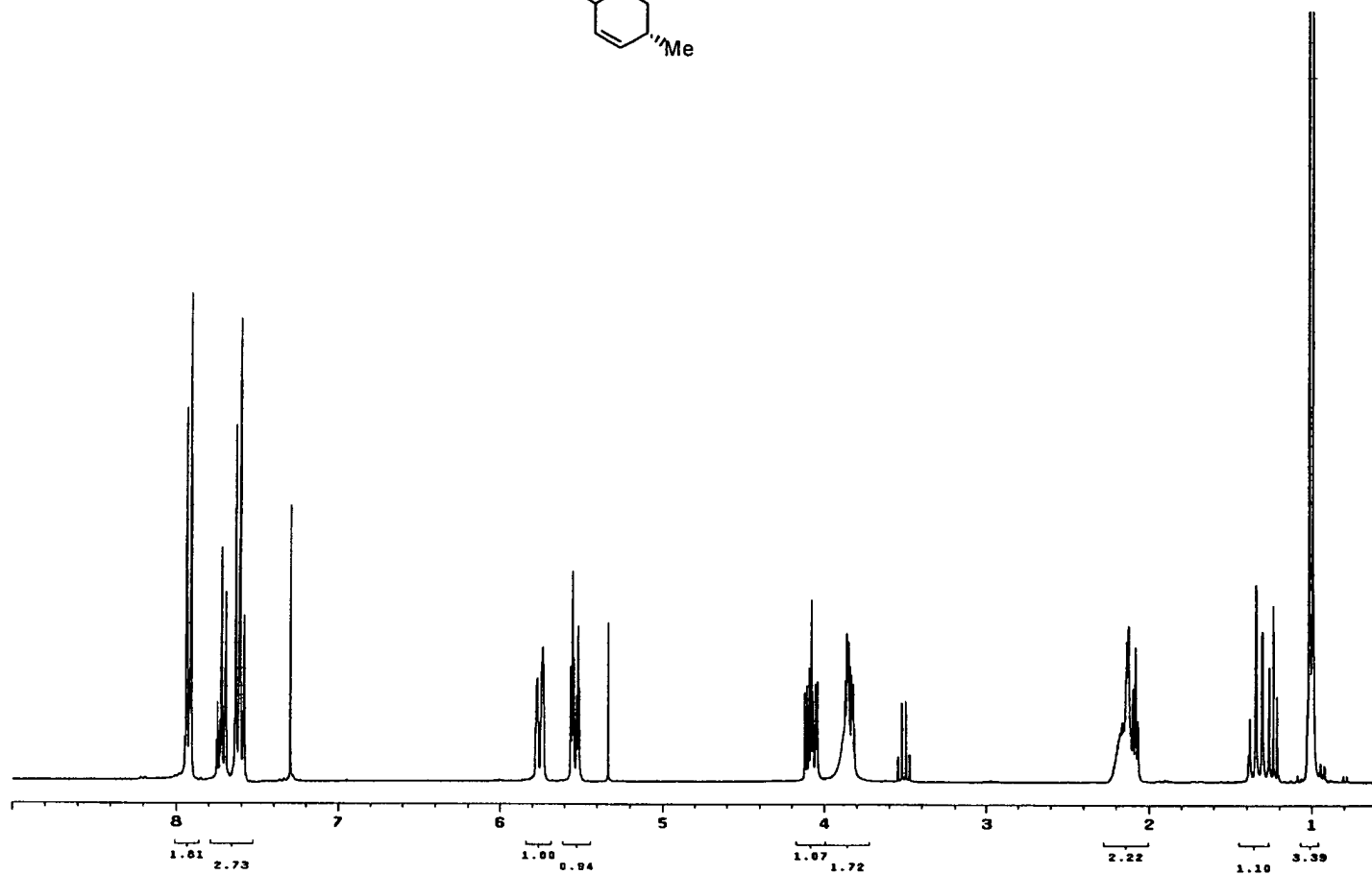
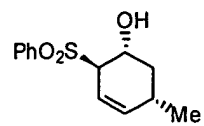
300MHz ^1H NMR of compound **31** in CDCl_3

FIGURE 8 (Cont'd)



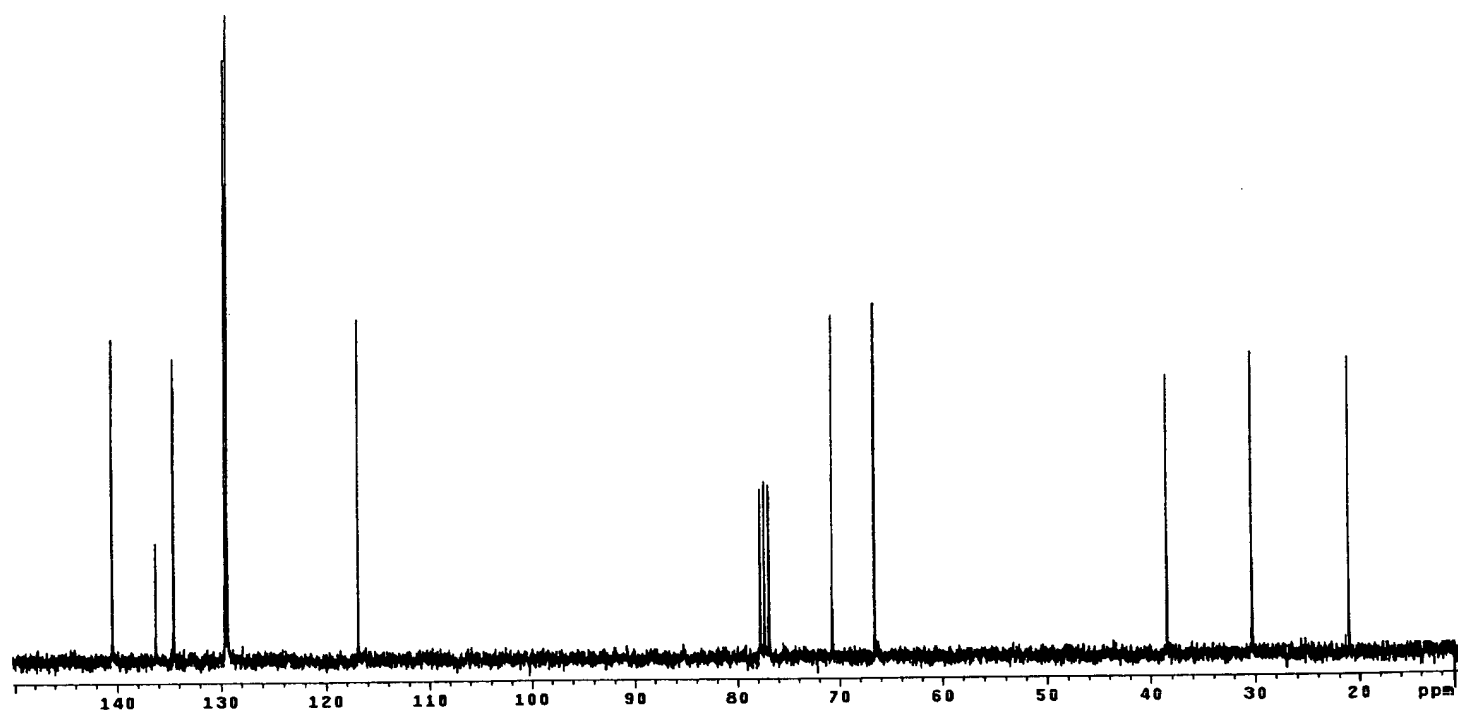
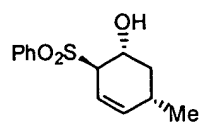
75MHz ^{13}C NMR of compound **31** in CDCl_3

FIGURE 8 (Cont'd)



300MHz ¹H NMR of compound 32 in CDCl₃

FIGURE 8 (Cont'd)



75MHz ^{13}C NMR of compound **32** in CDCl_3

FIGURE 8 (Cont'd)

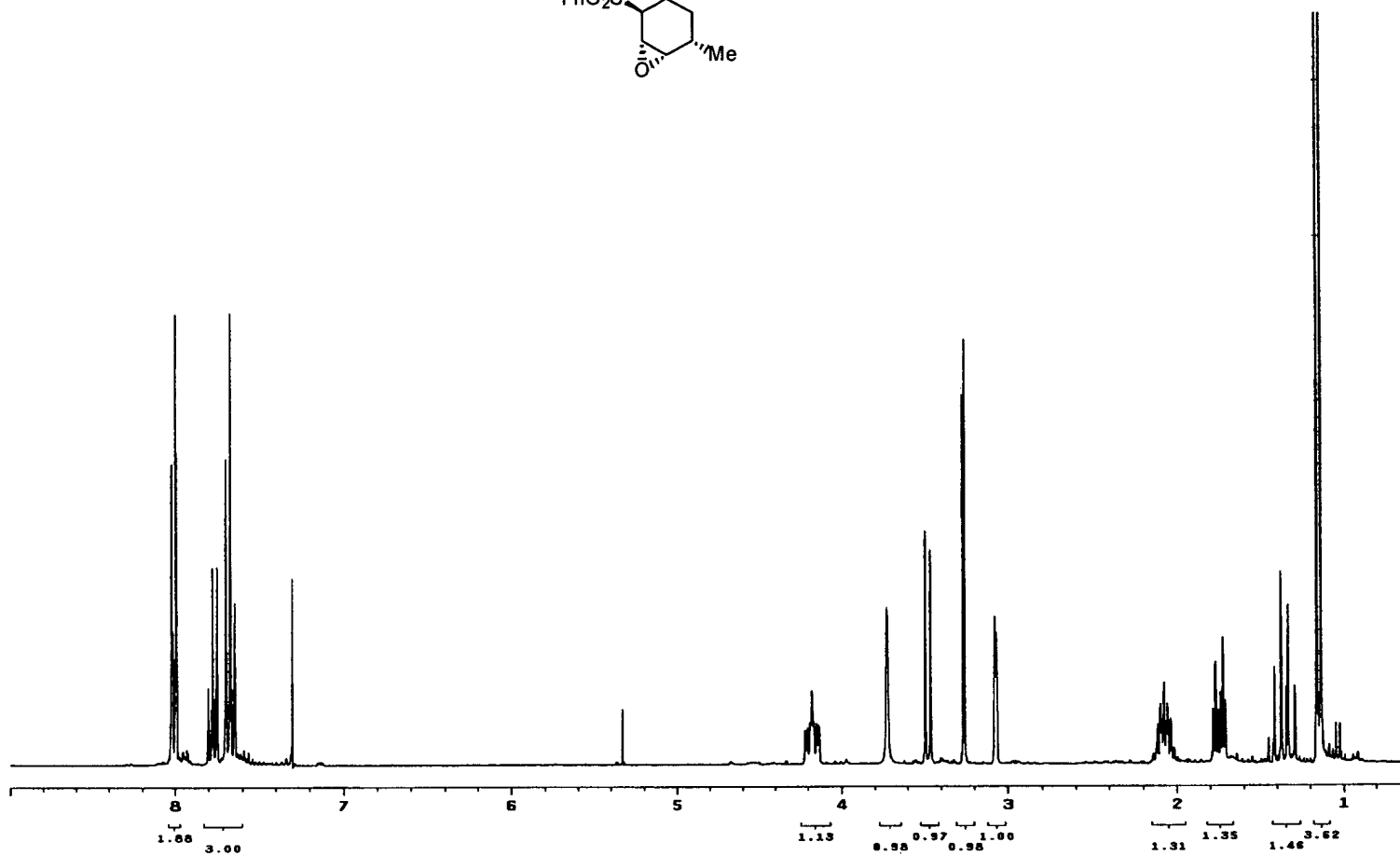
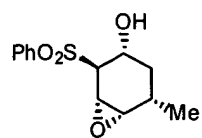
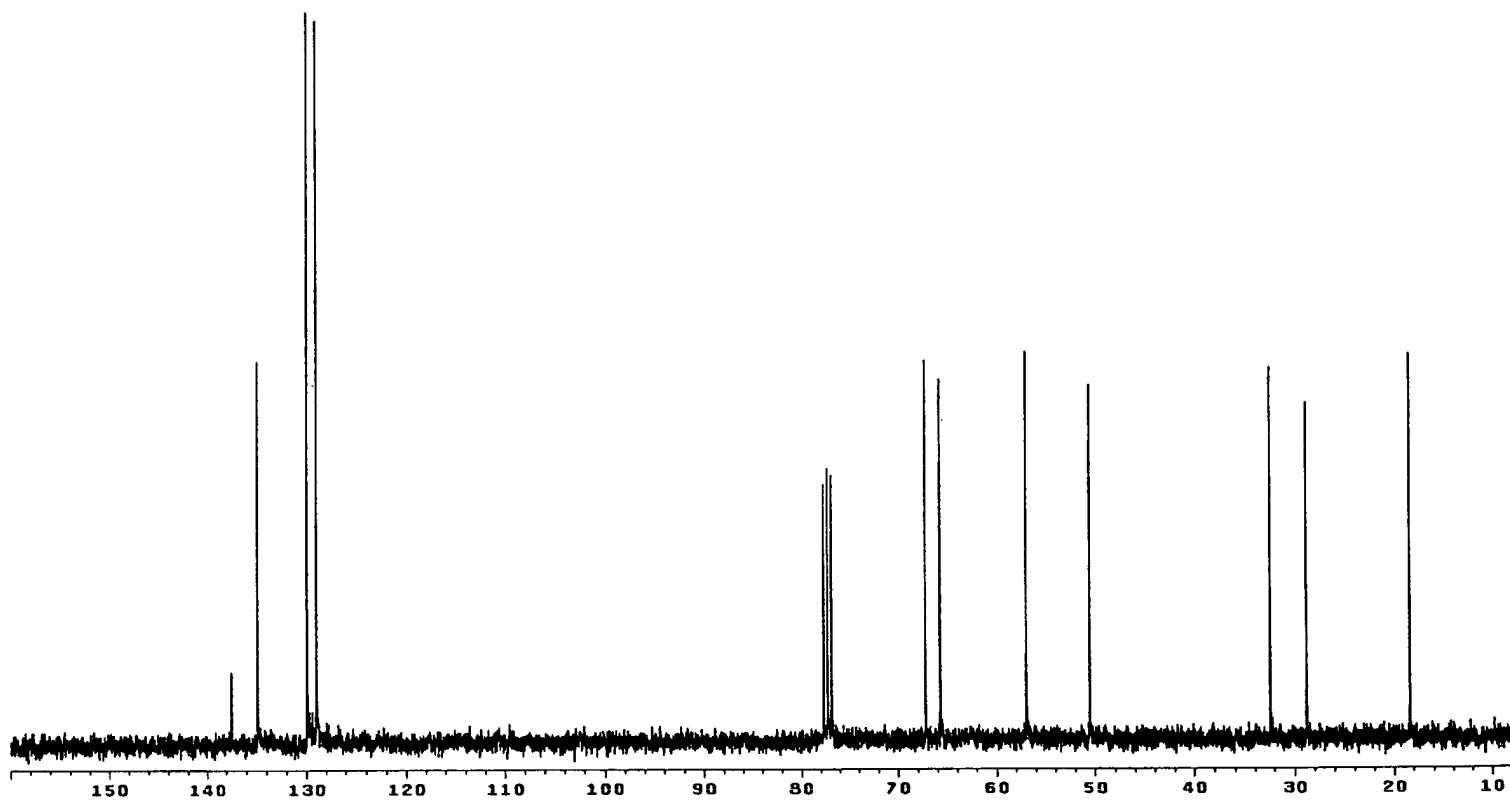
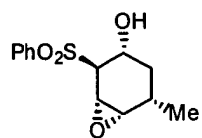
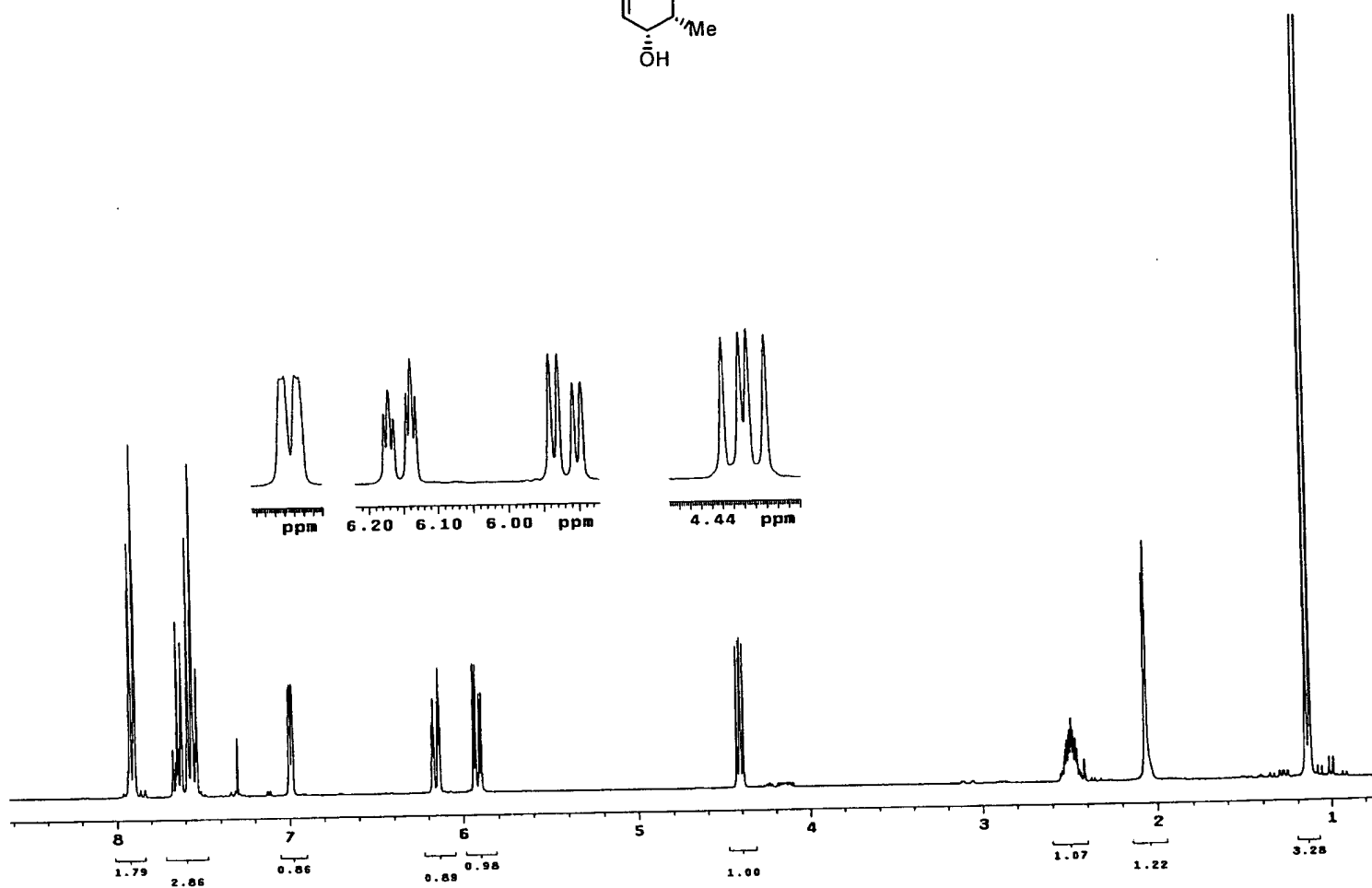
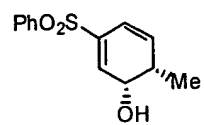


FIGURE 8 (Cont'd)



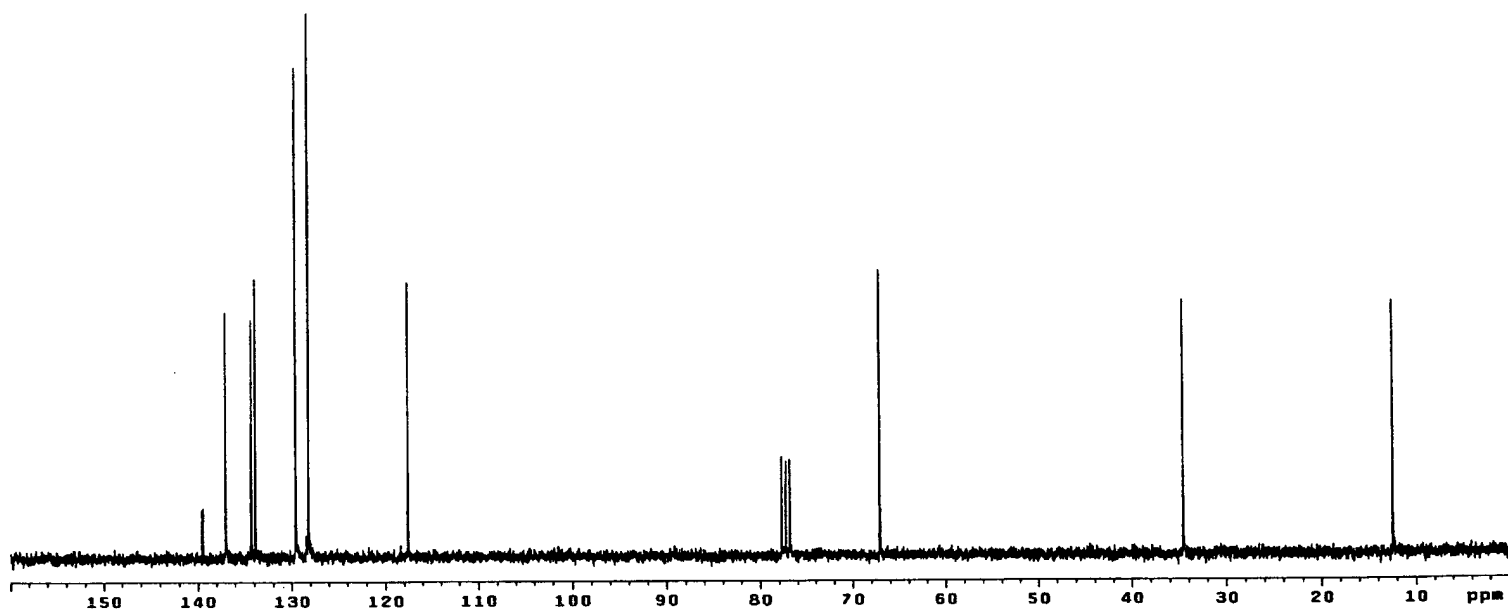
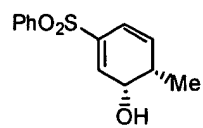
75MHz ¹³C NMR of compound 33 in CDCl₃

FIGURE 8 (Cont'd)



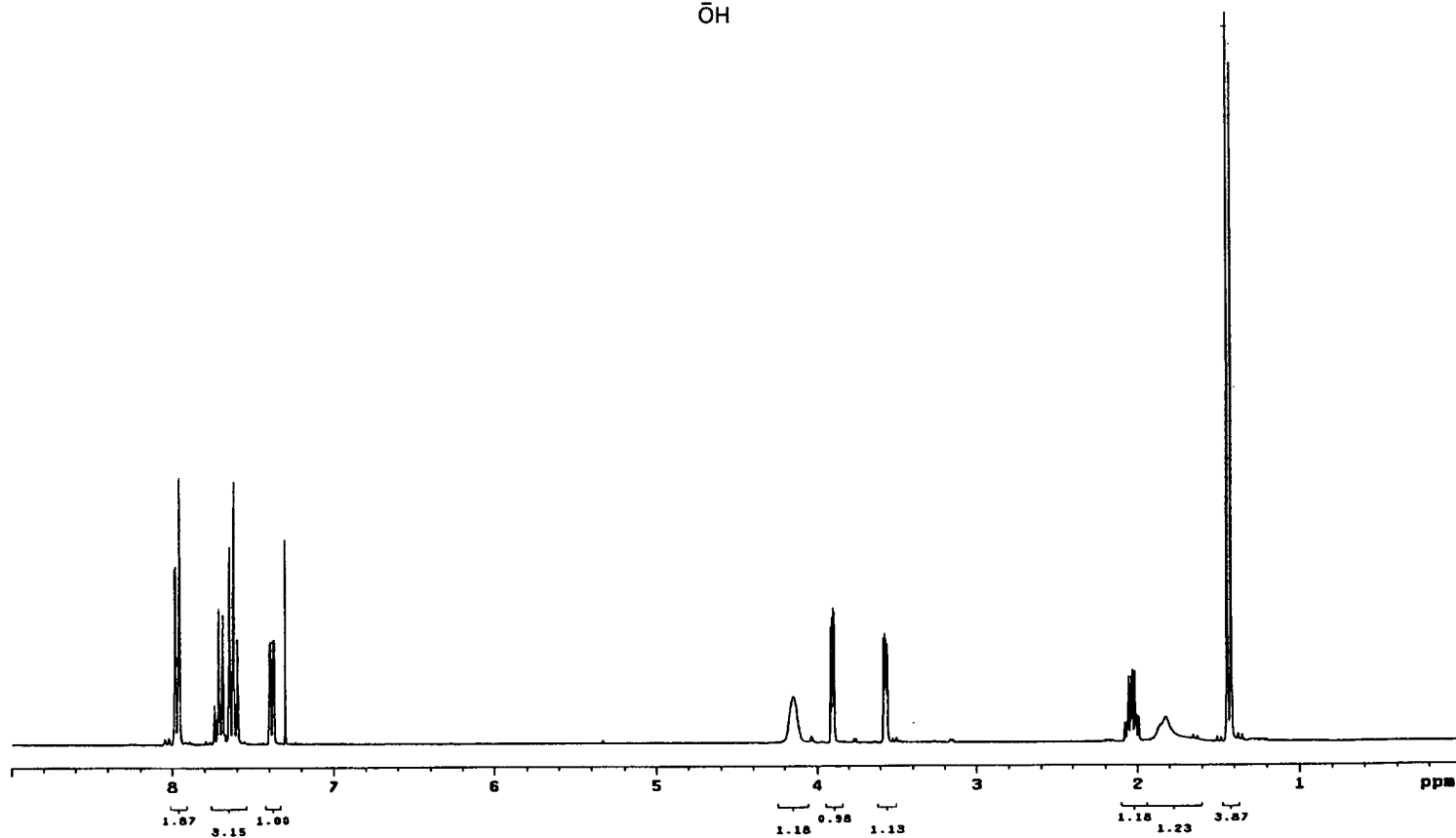
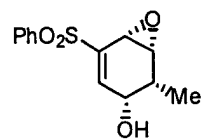
300MHz ¹H NMR of compound 35 in CDCl₃

FIGURE 8 (Cont'd)



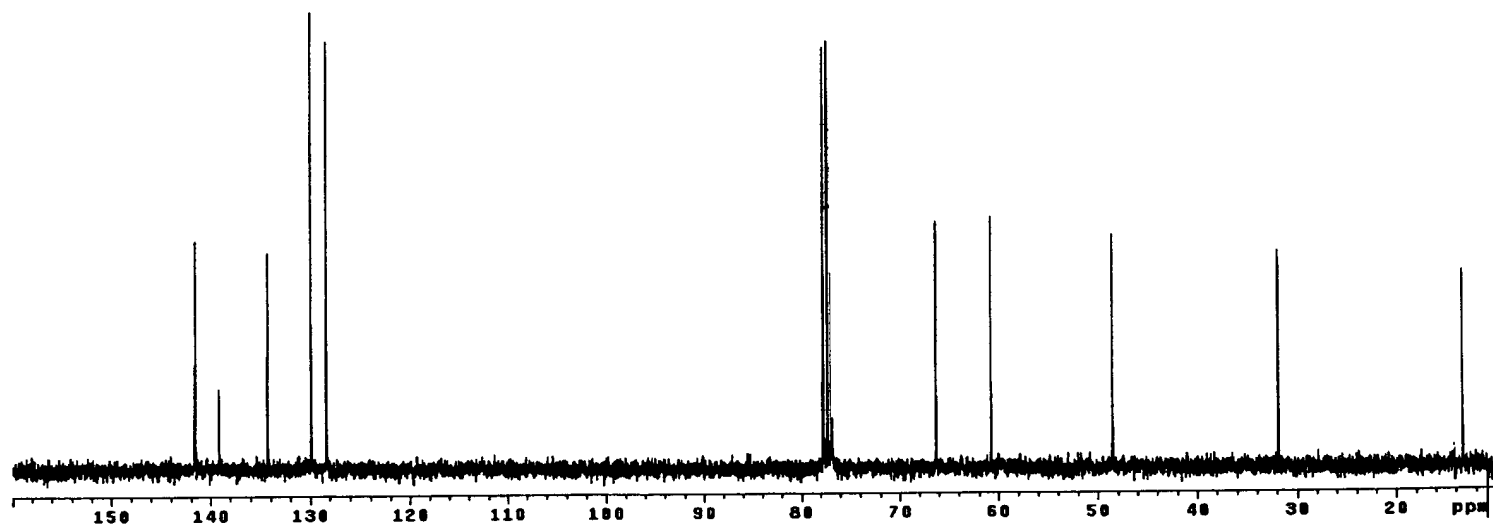
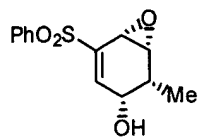
75MHz ¹³C NMR of compound 35 in CDCl₃

FIGURE 8 (Cont'd)



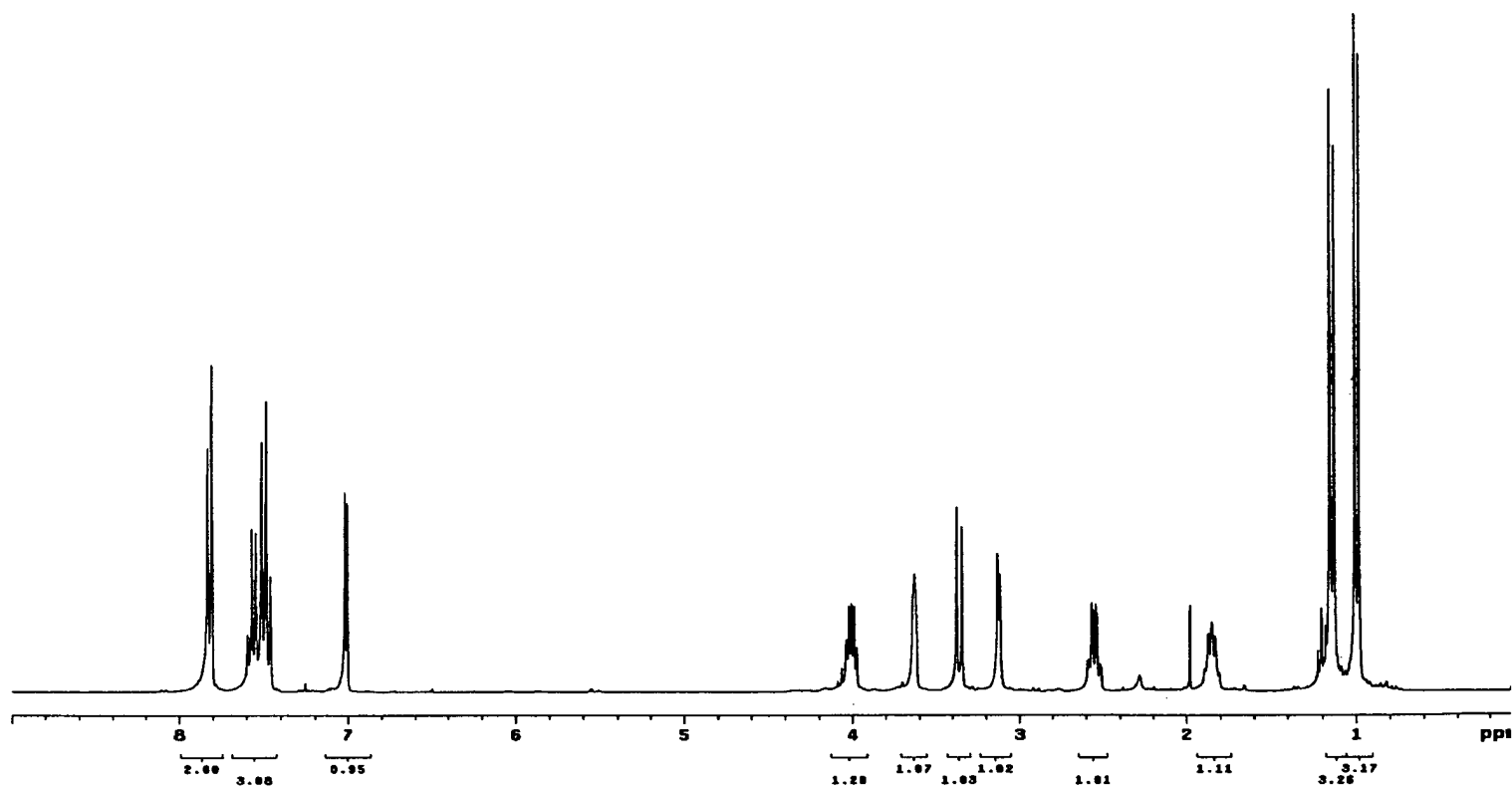
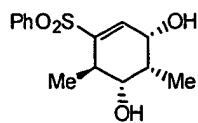
300MHz ^1H NMR of compound 36 in CDCl_3

FIGURE 8 (Cont'd)



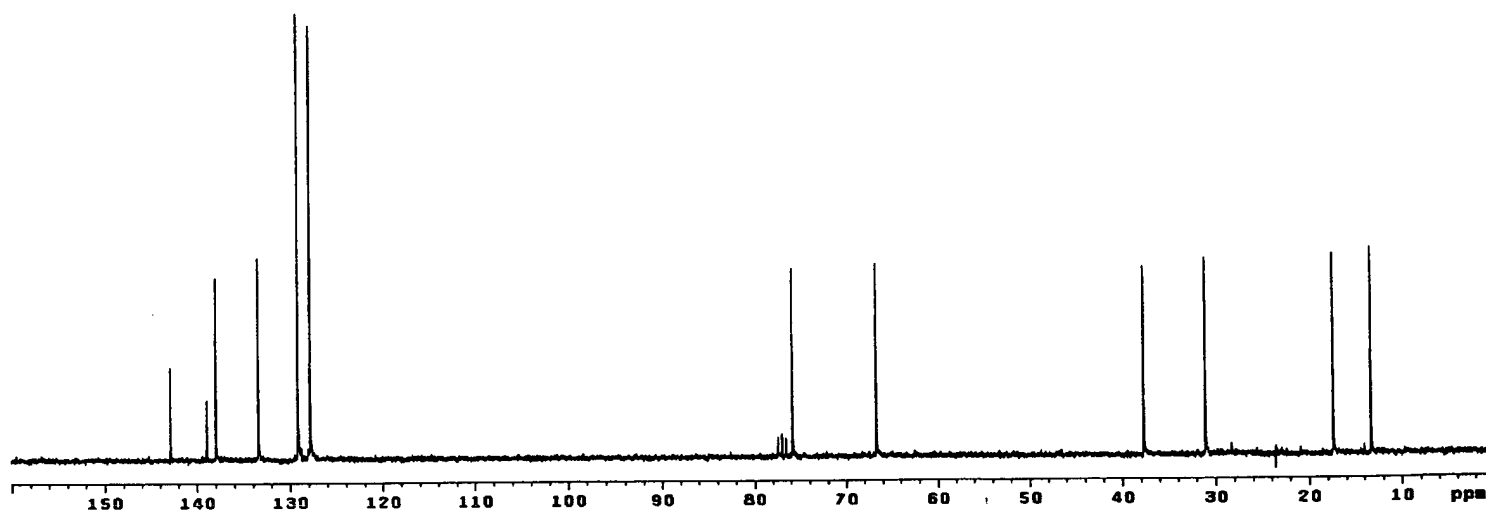
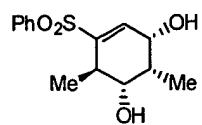
75MHz ¹³C NMR of compound 36 in CDCl₃

FIGURE 8 (Cont'd)



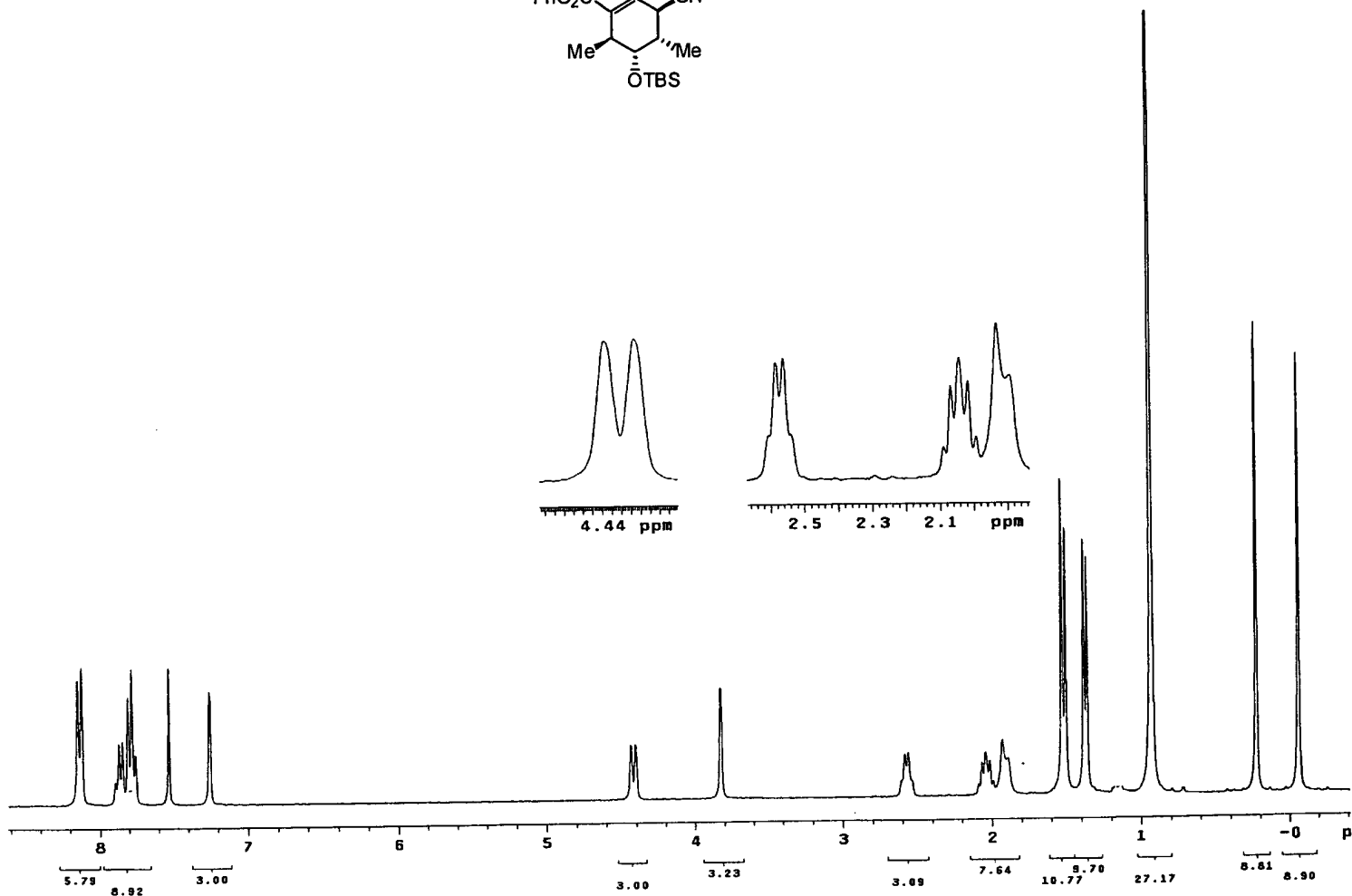
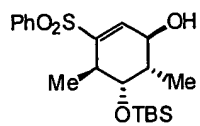
300MHz ¹H NMR of compound 37 in CDCl₃

FIGURE 8 (Cont'd)



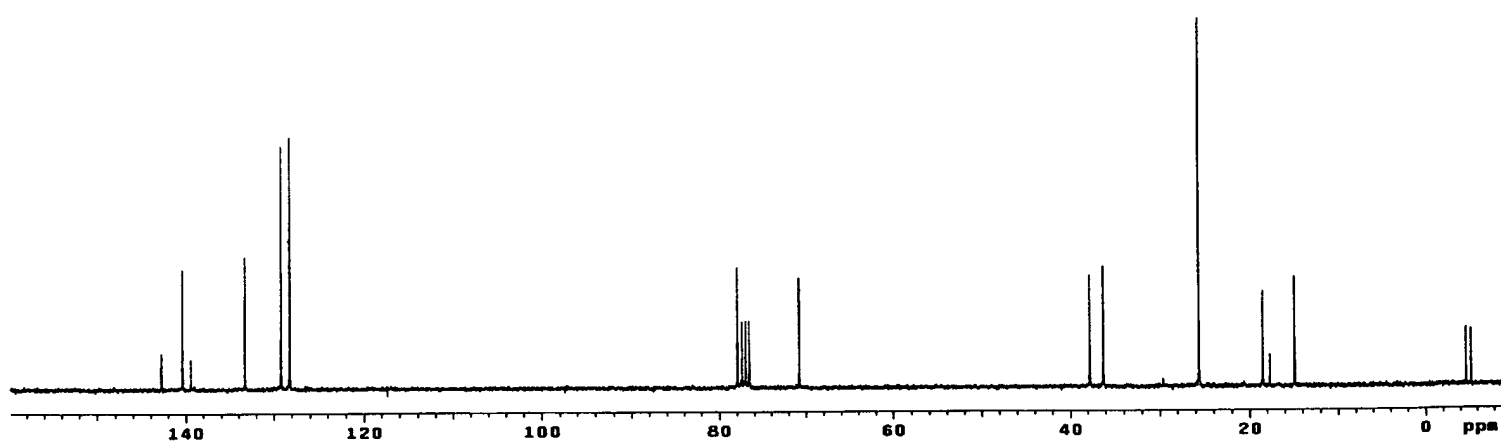
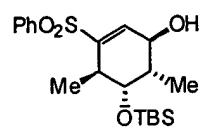
75MHz ^{13}C NMR of compound 37 in CDCl_3

FIGURE 8 (Cont'd)



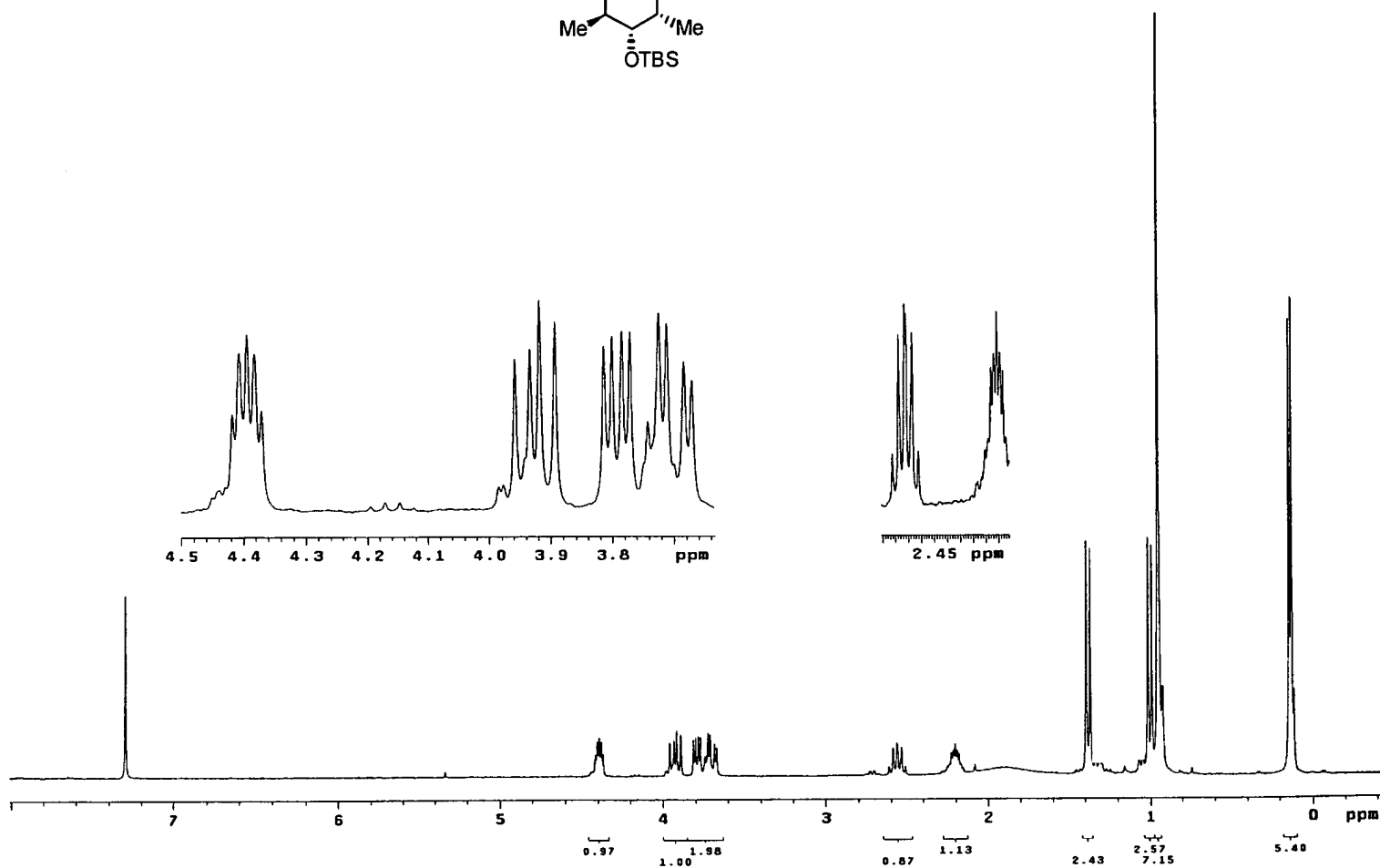
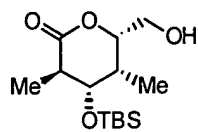
300MHz ¹H NMR of compound 38 in CDCl₃

FIGURE 8 (Cont'd)



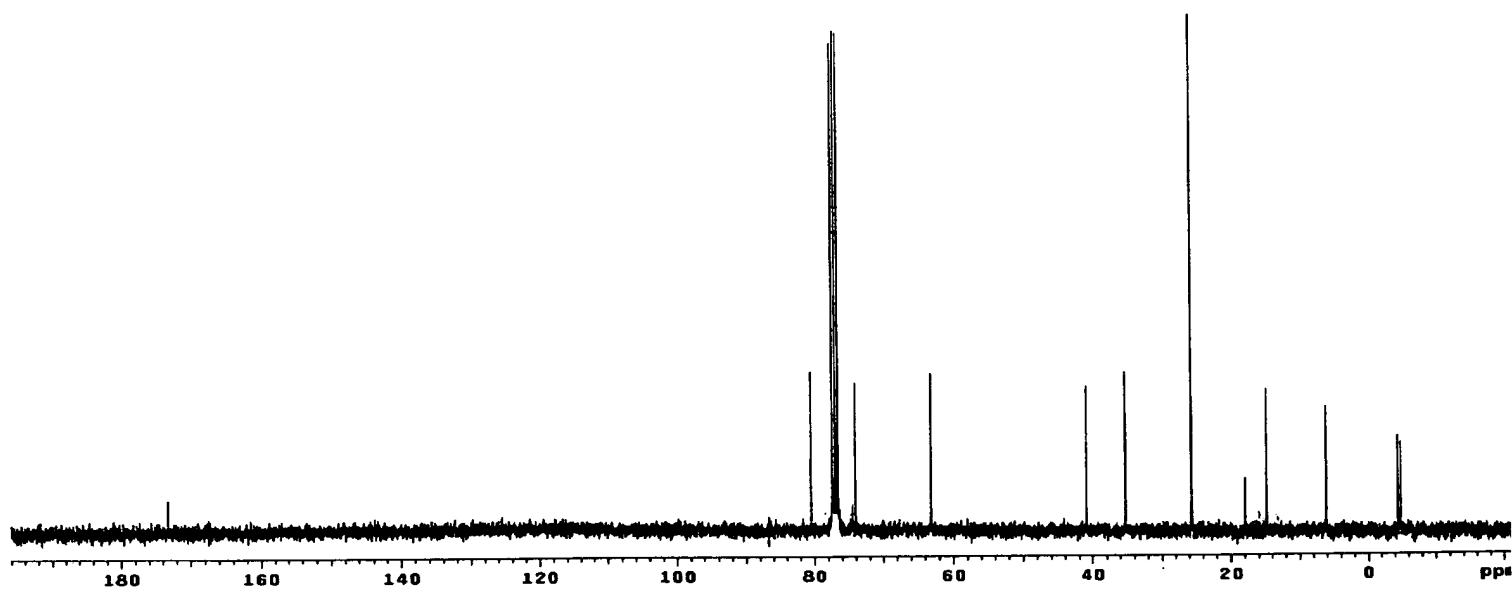
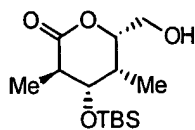
75MHz ^{13}C NMR of compound **38** in CDCl_3

FIGURE 8 (Cont'd)



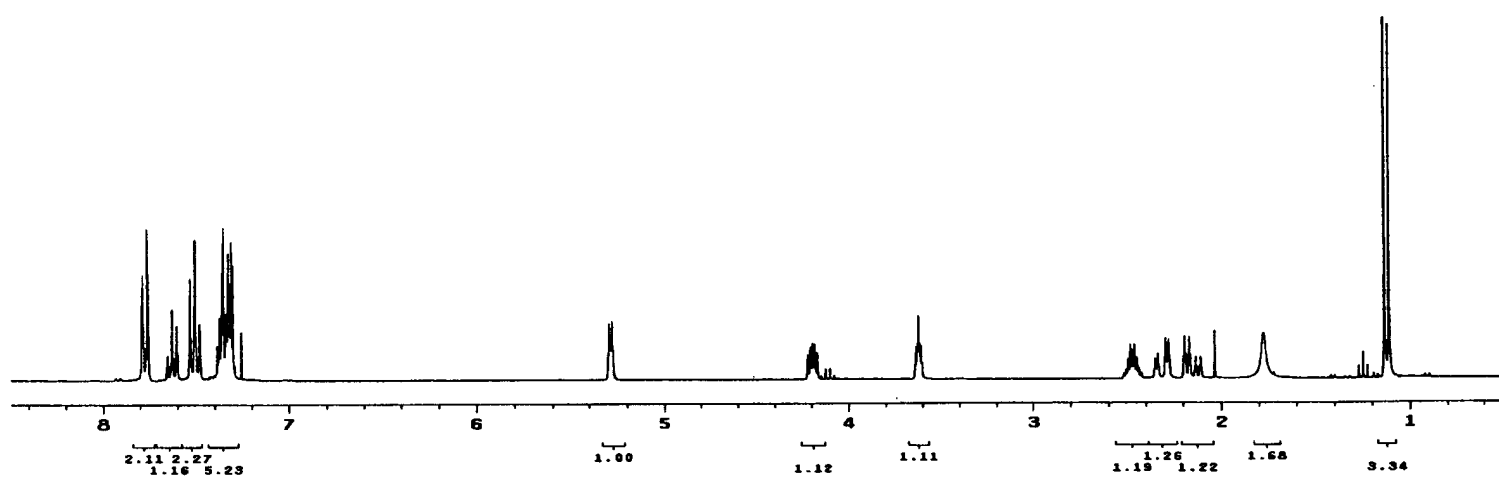
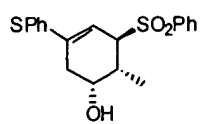
300MHz ^1H NMR of compound 39 in CDCl_3

FIGURE 8 (Cont'd)



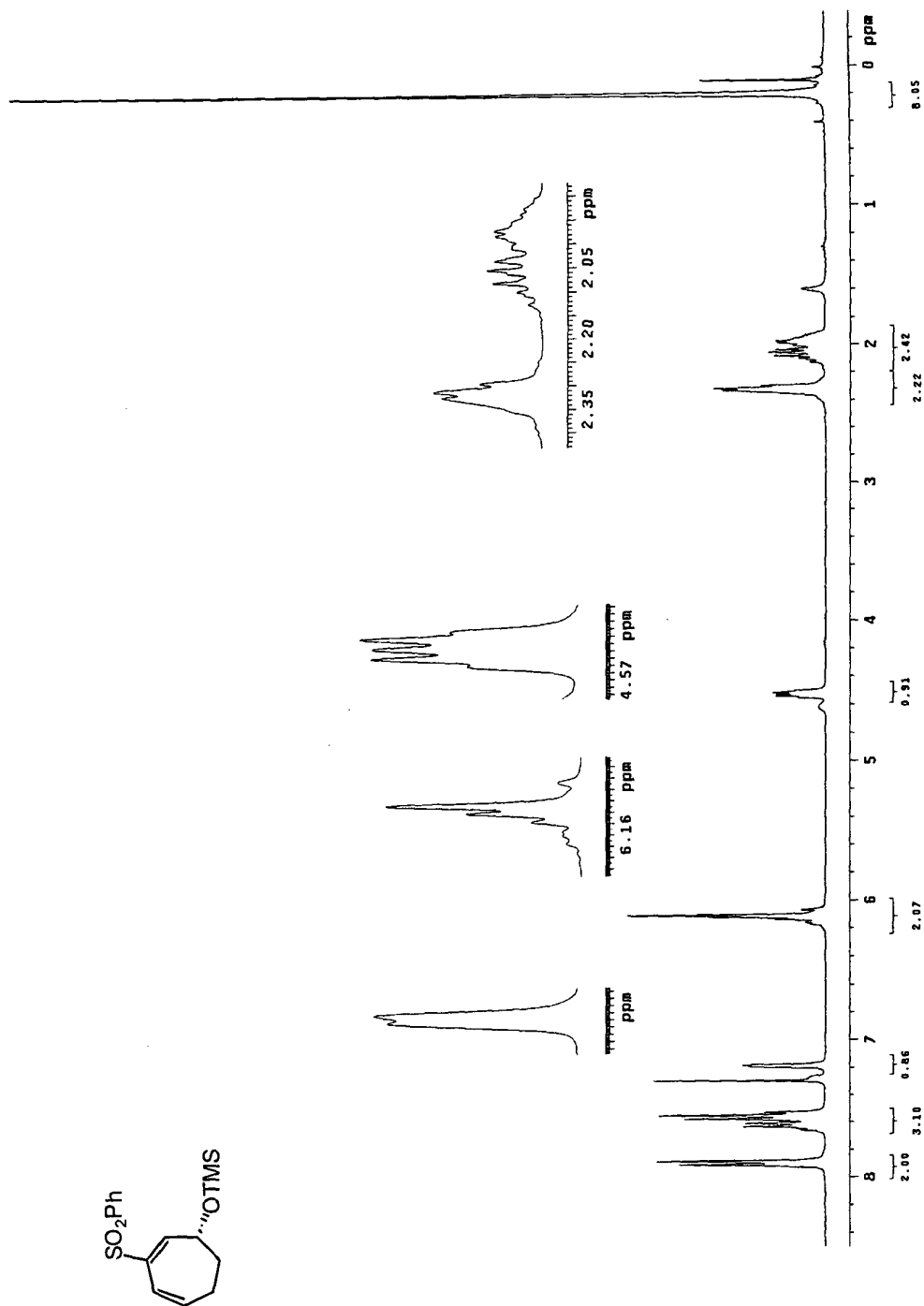
75MHz ^{13}C NMR of compound 39 in CDCl_3

FIGURE 8 (Cont'd)



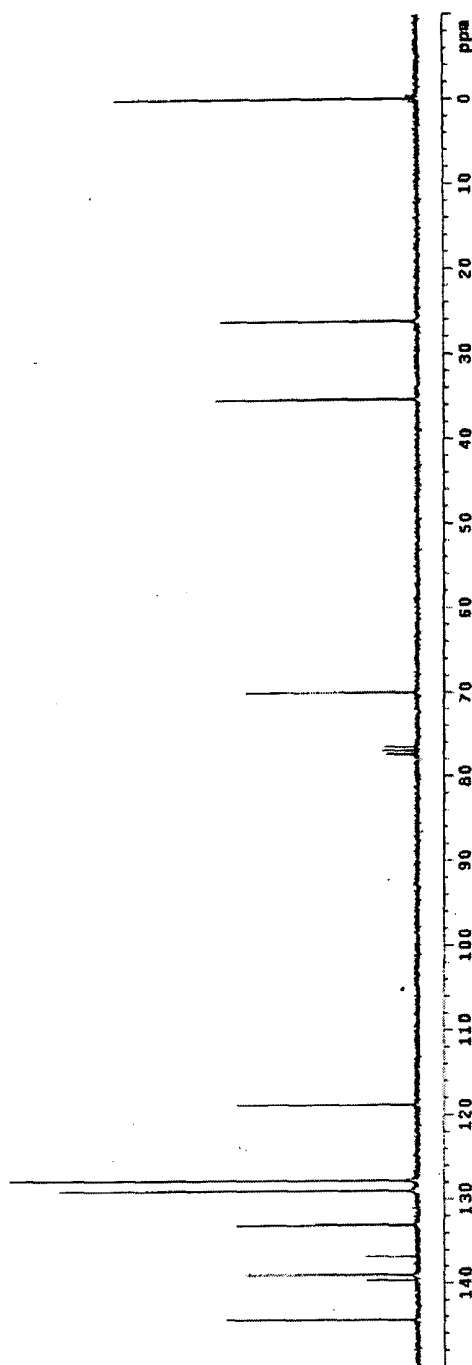
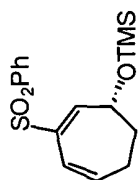
300MHz ¹H NMR of compound 43β in CDCl₃

FIGURE 8 (Cont'd)



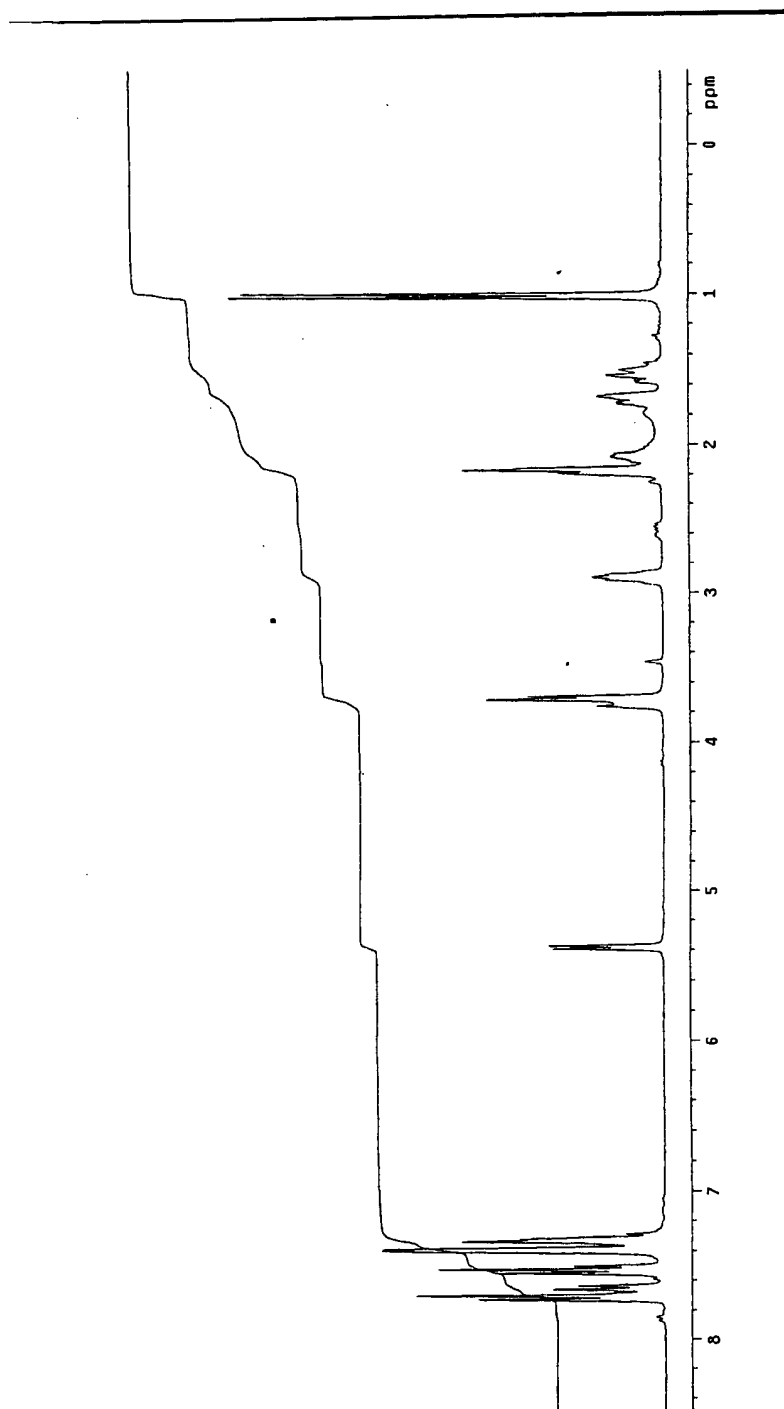
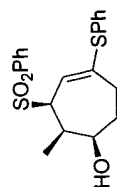
300MHz ^1H NMR of compound 13 in CDCl_3

FIGURE 8 (Cont'd)



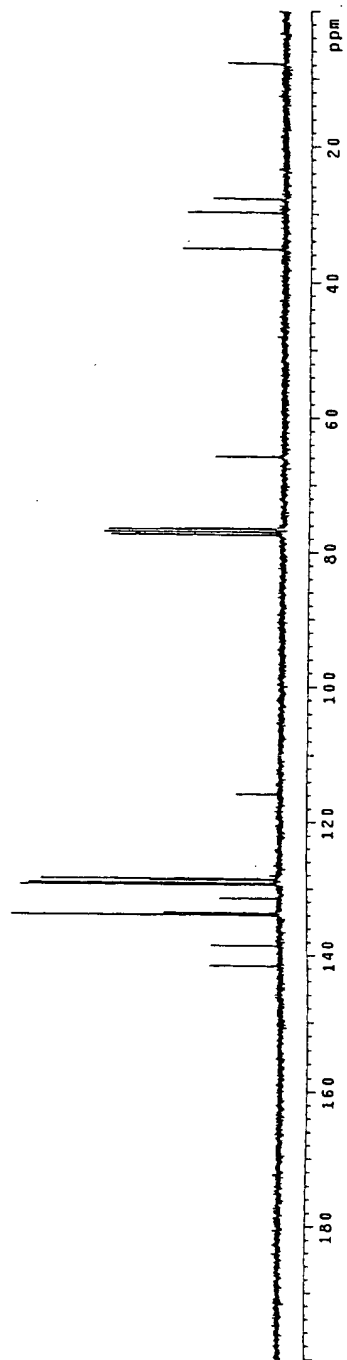
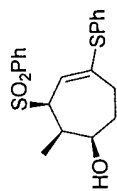
75MHz ^{13}C NMR of compound 13 in CDCl_3

FIGURE 8 (Cont'd)



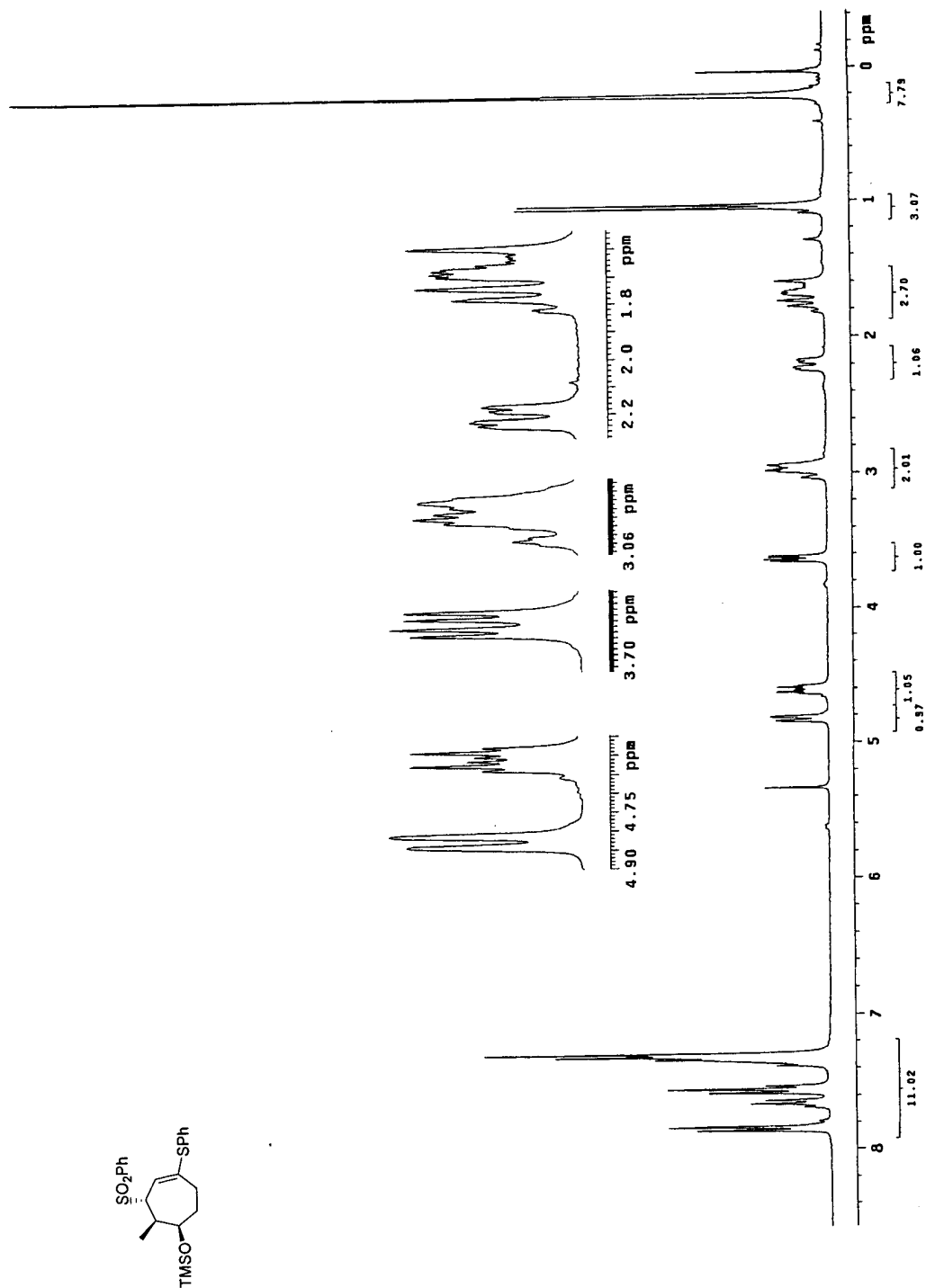
300MHz ¹H NMR of compound 21 in CDCl₃ 3

FIGURE 8 (Cont'd)



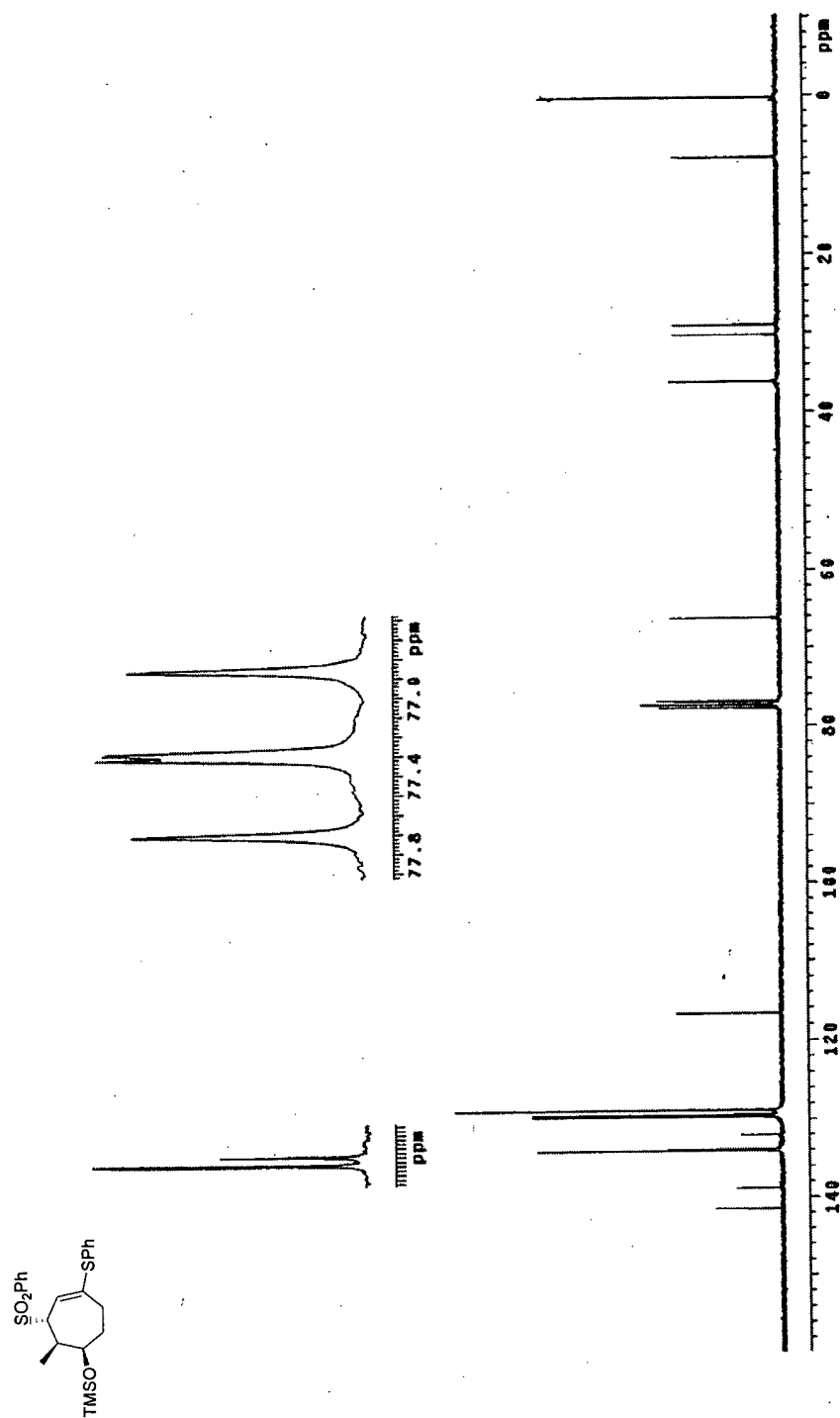
75MHz ^{13}C NMR of compound 21 in CDCl_3

FIGURE 8 (Cont'd)



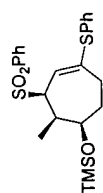
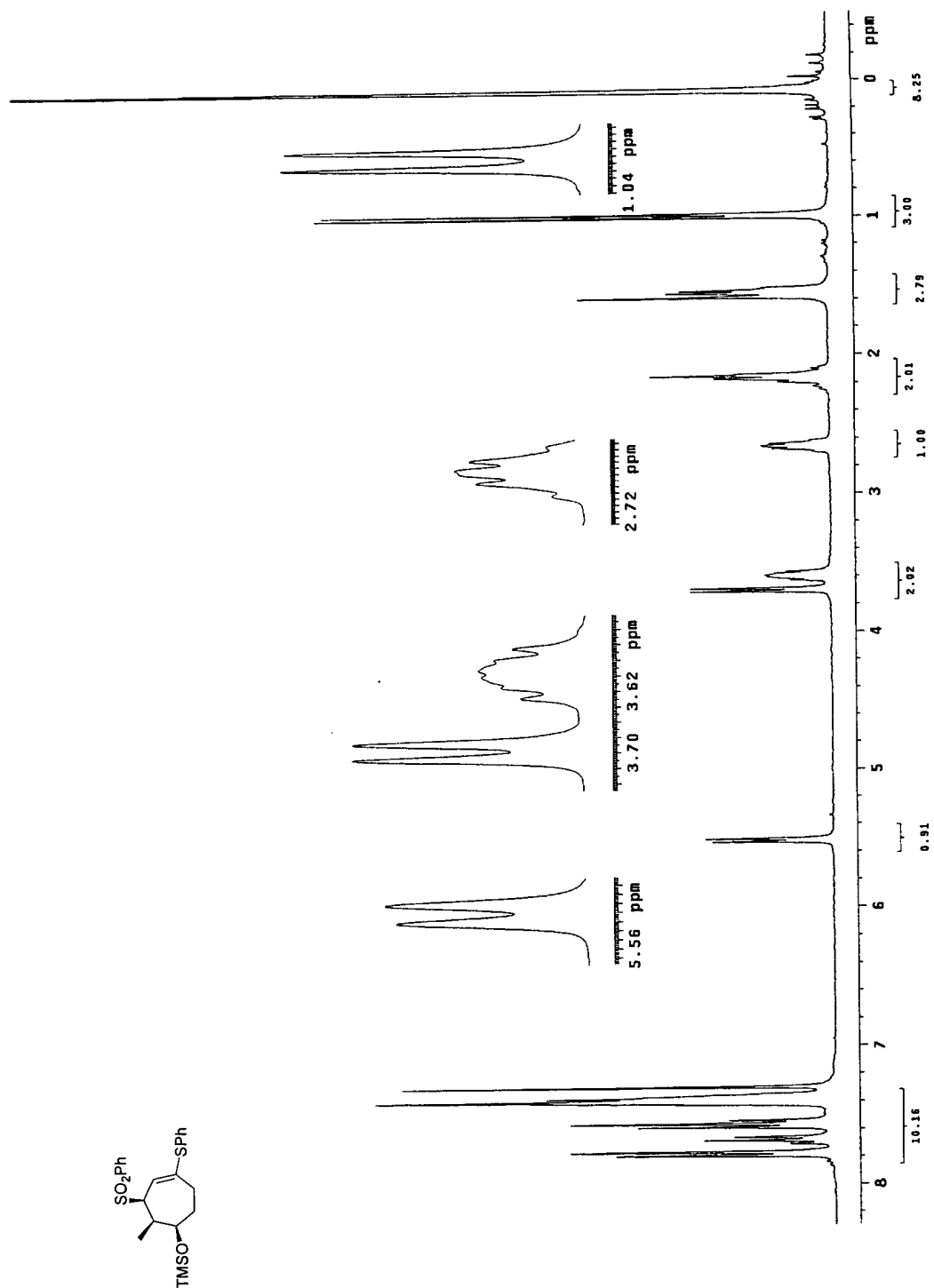
300MHz ^1H NMR of compound 23 α in CDCl_3 3

FIGURE 8 (Cont'd)



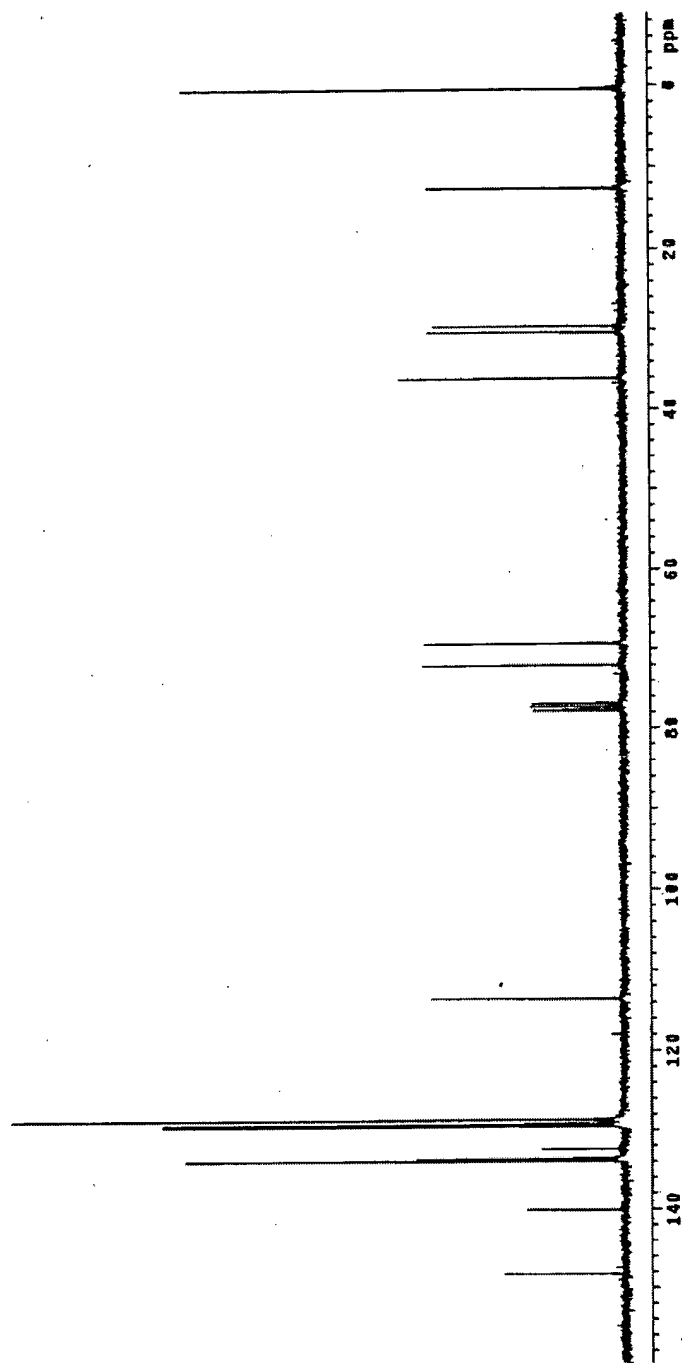
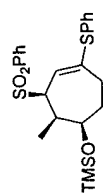
75MHz ¹³C NMR of compound 23 α in CDCl₃ 3

FIGURE 8 (Cont'd)



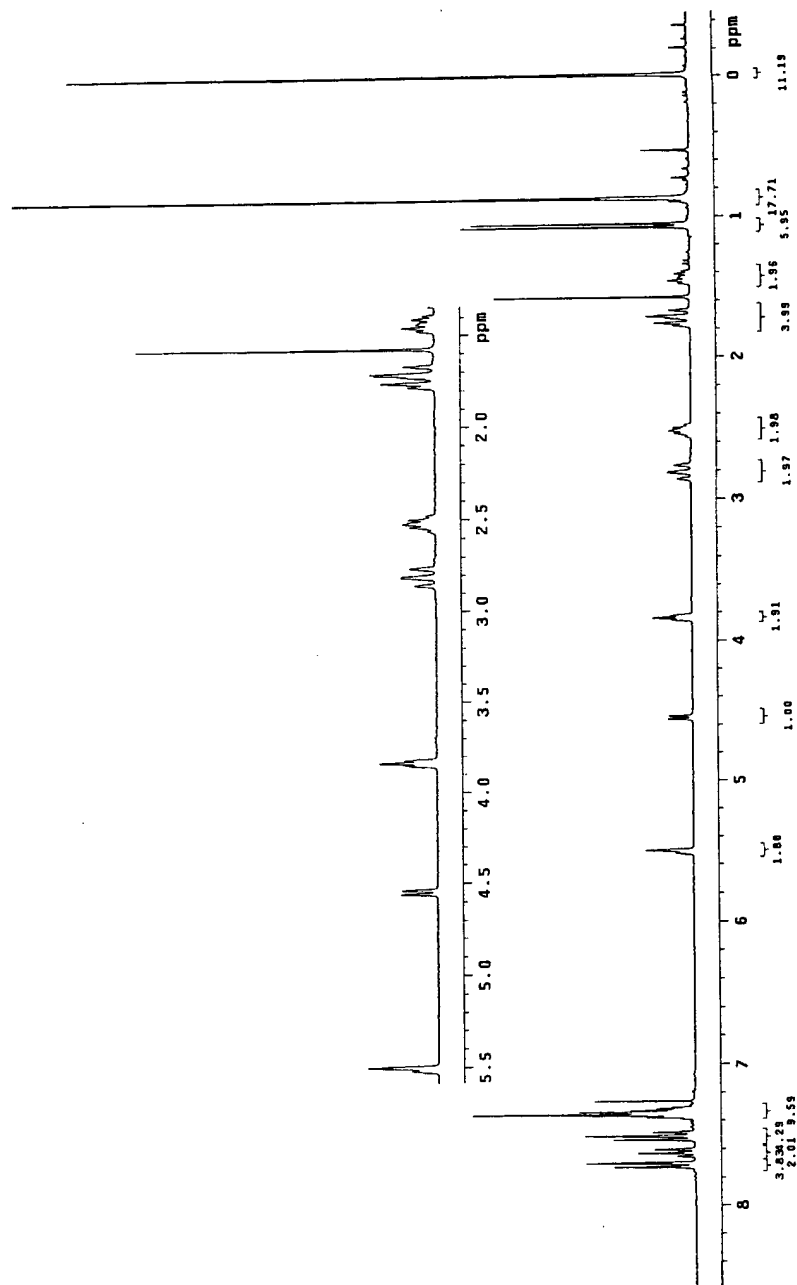
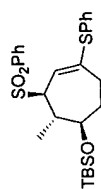
300MHz ¹H NMR of compound 23 β in CDCl₃ 3

FIGURE 8 (Cont'd)



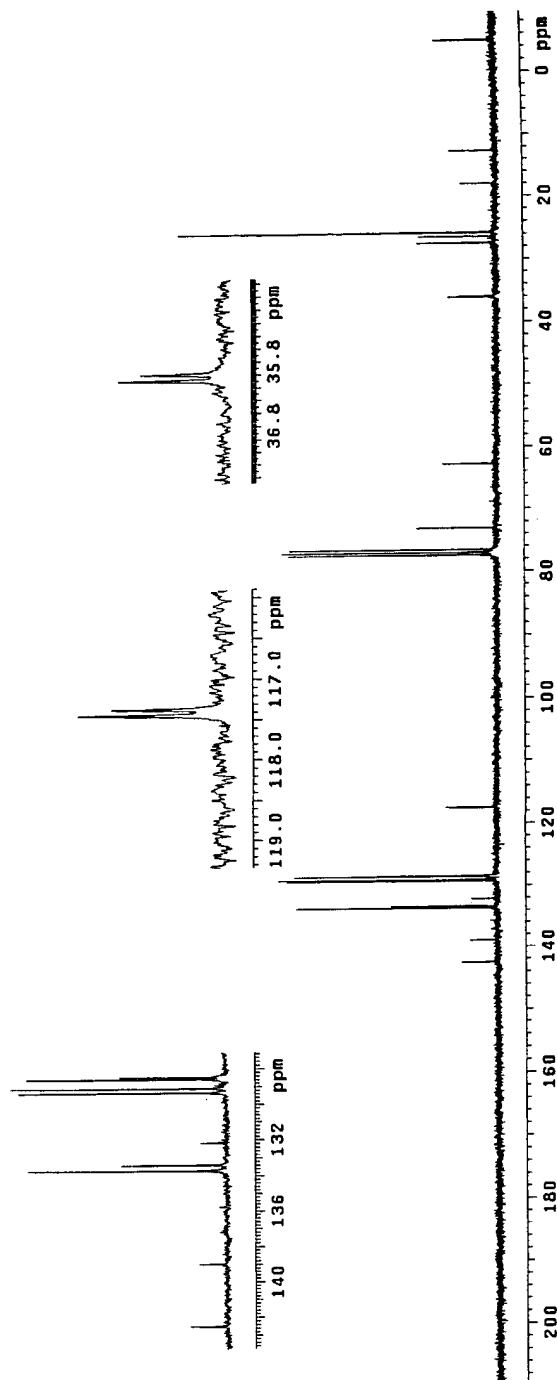
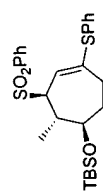
75MHz ¹³C NMR of compound 23 β in CDCl₃ 3

FIGURE 8 (Cont'd)



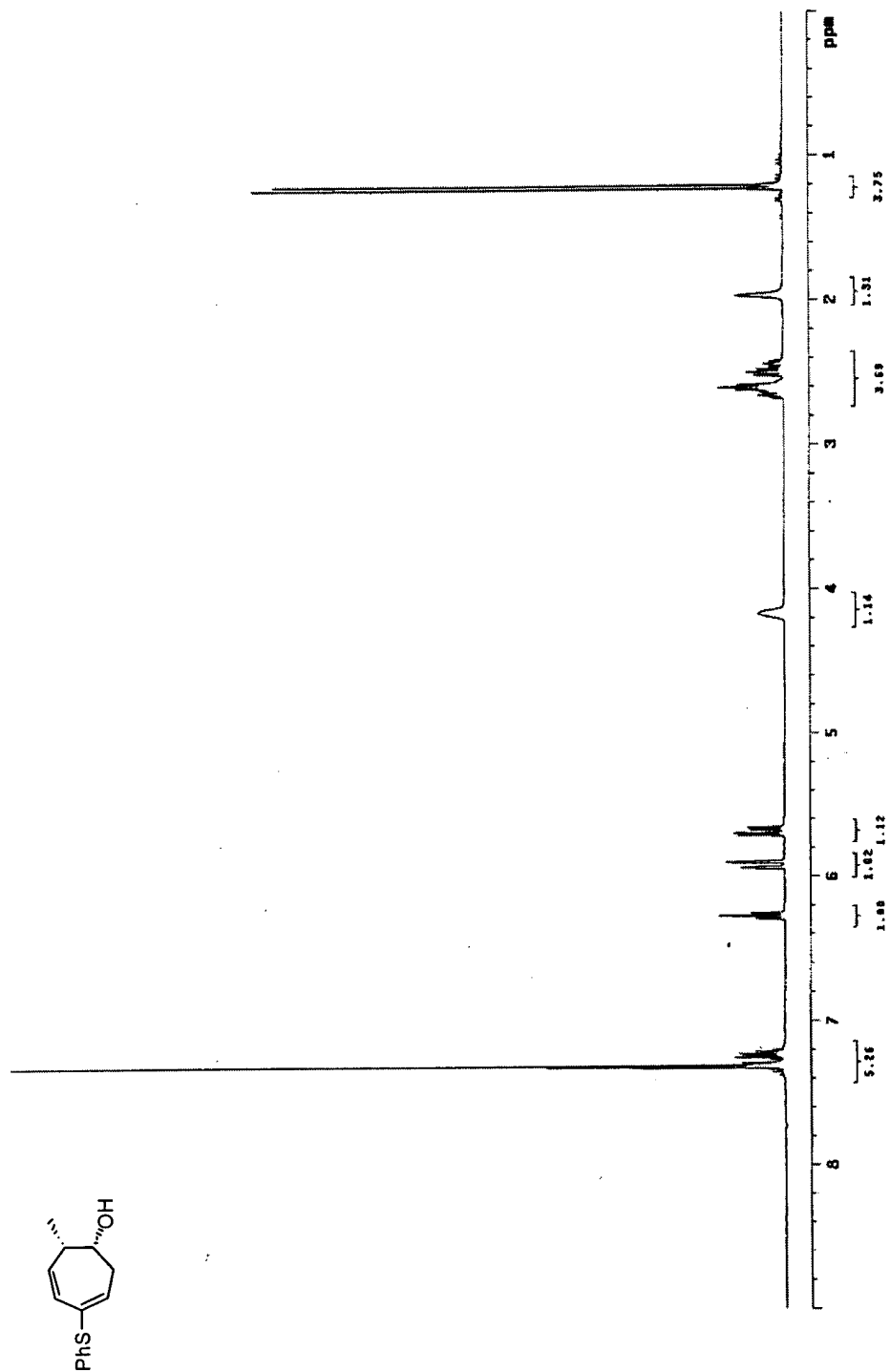
300MHz ¹H NMR of compound 22 in CDCl₃

FIGURE 8 (Cont'd)



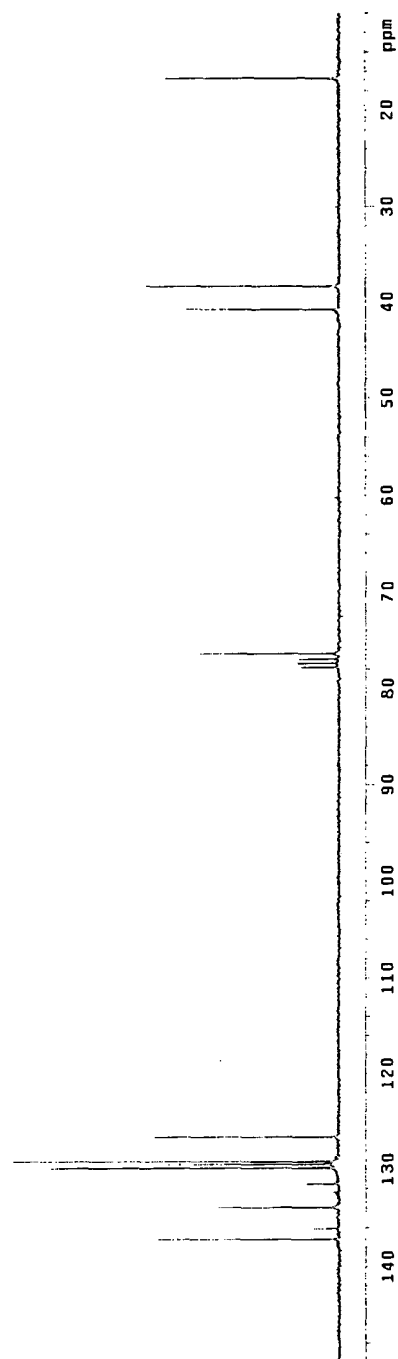
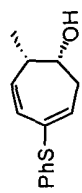
75MHz ¹³C NMR of compound 22 in CDCl₃

FIGURE 8 (Cont'd)

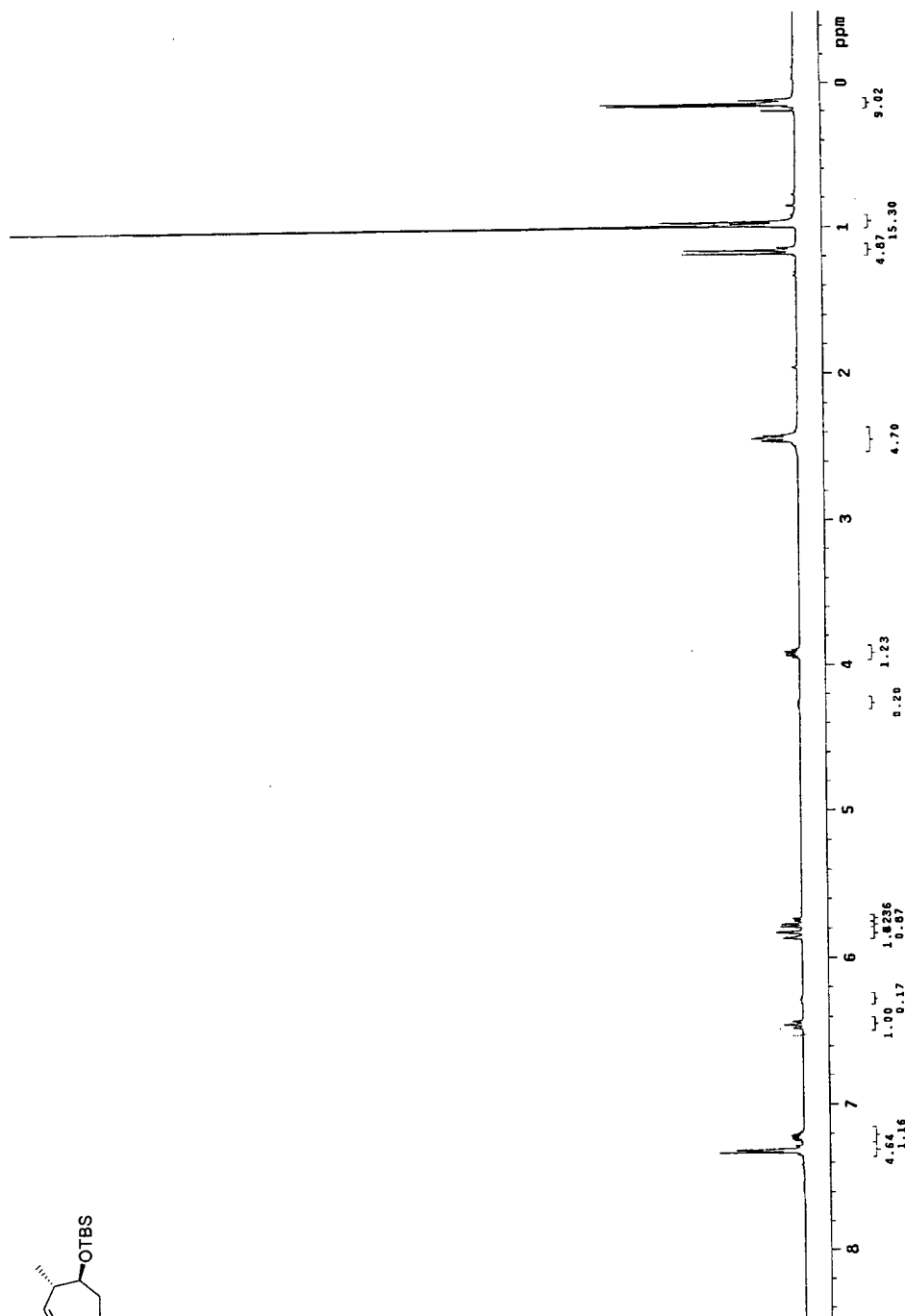


300MHz ¹H NMR of compound 29 in CDCl₃

FIGURE 8 (Cont'd)

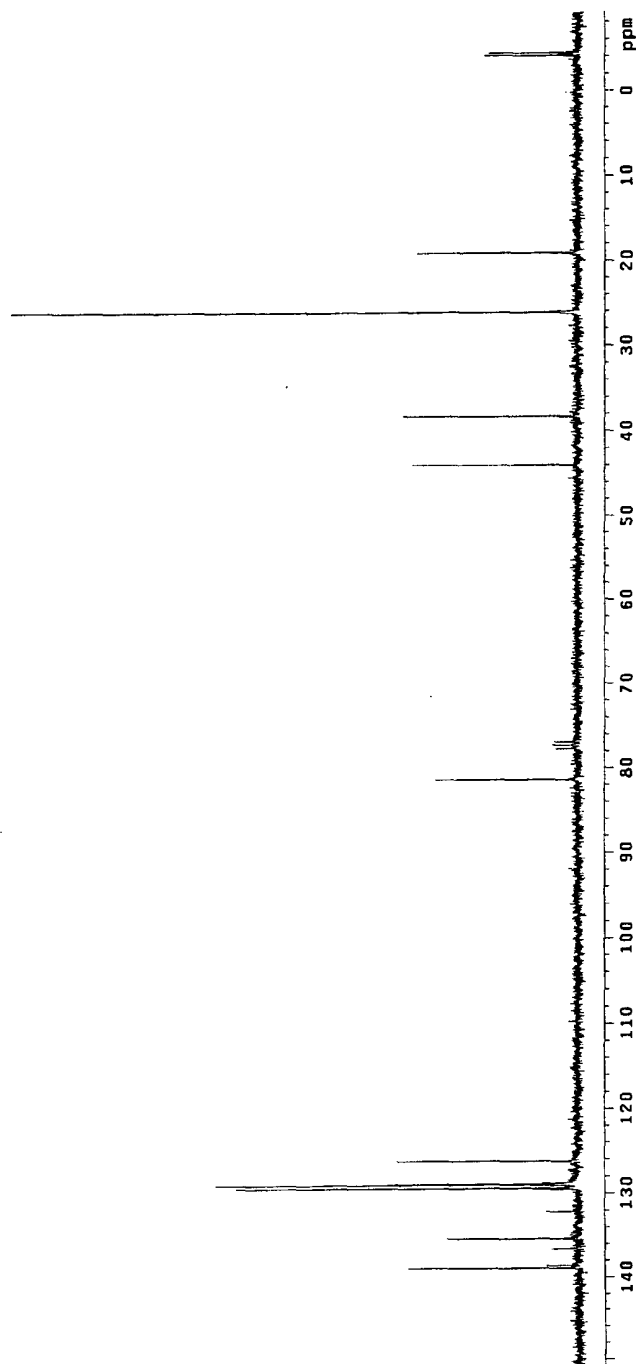
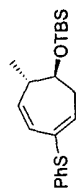


75MHz ¹³C NMR of compound 29 in CDCl₃



300MHz ^1H NMR of compound 27 in CDCl_3

FIGURE 8 (Cont'd)



75MHz ¹³C NMR of compound 27 in CDCl₃

FIGURE 8 (Cont'd)

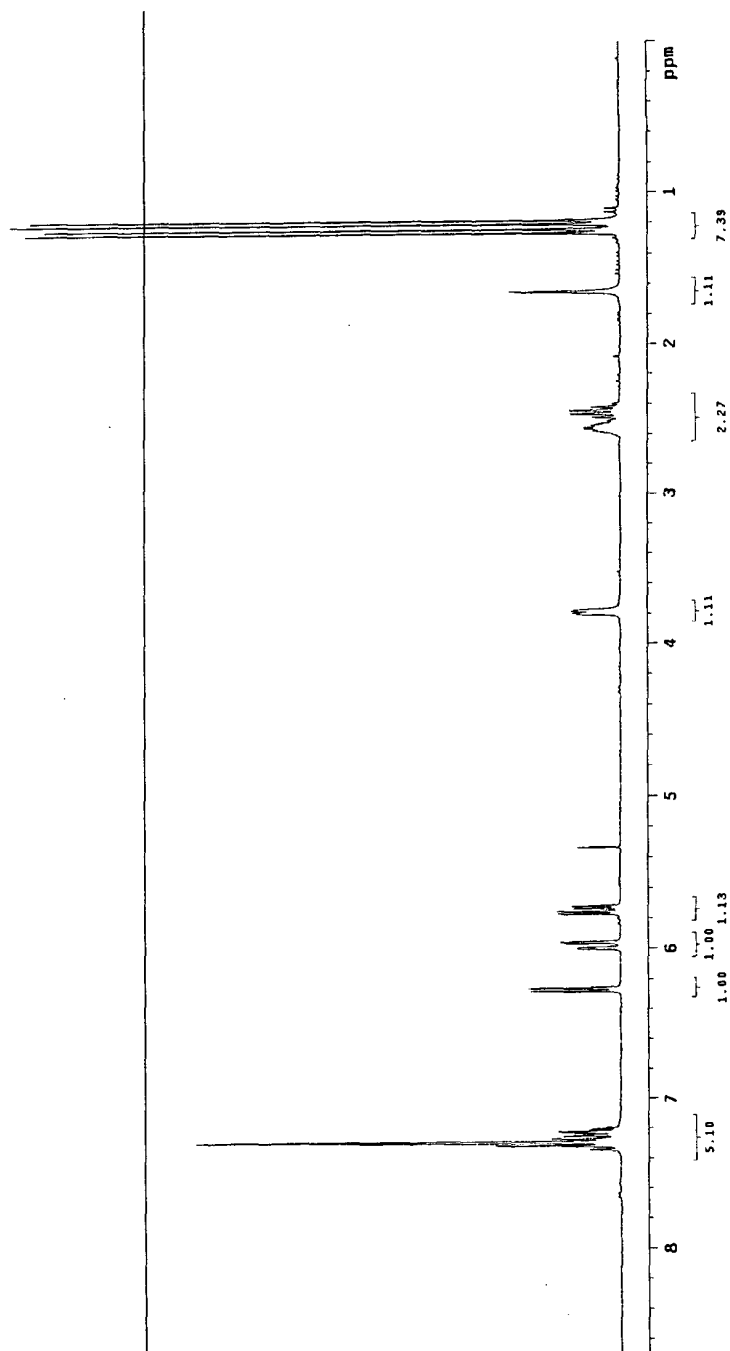
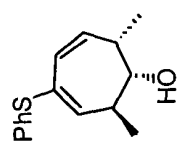
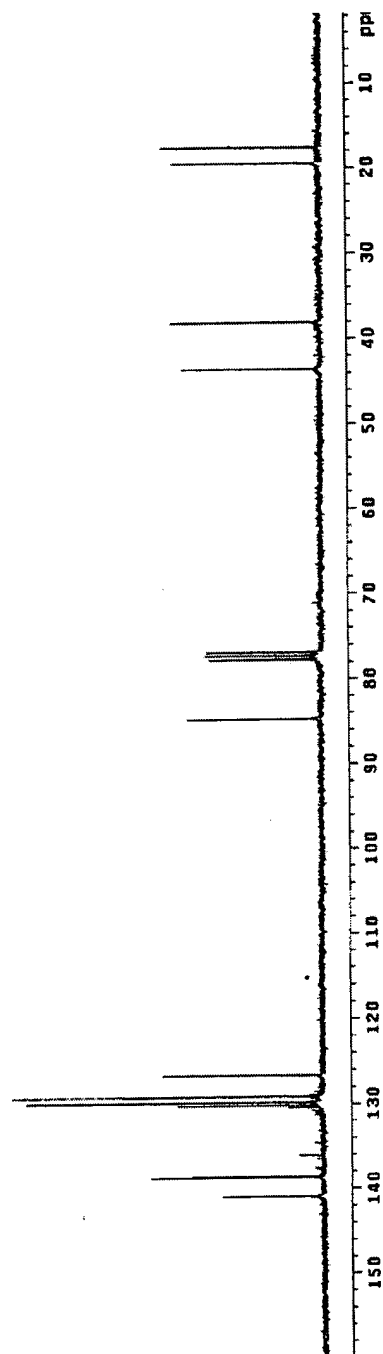
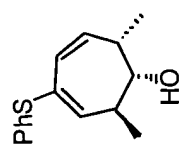
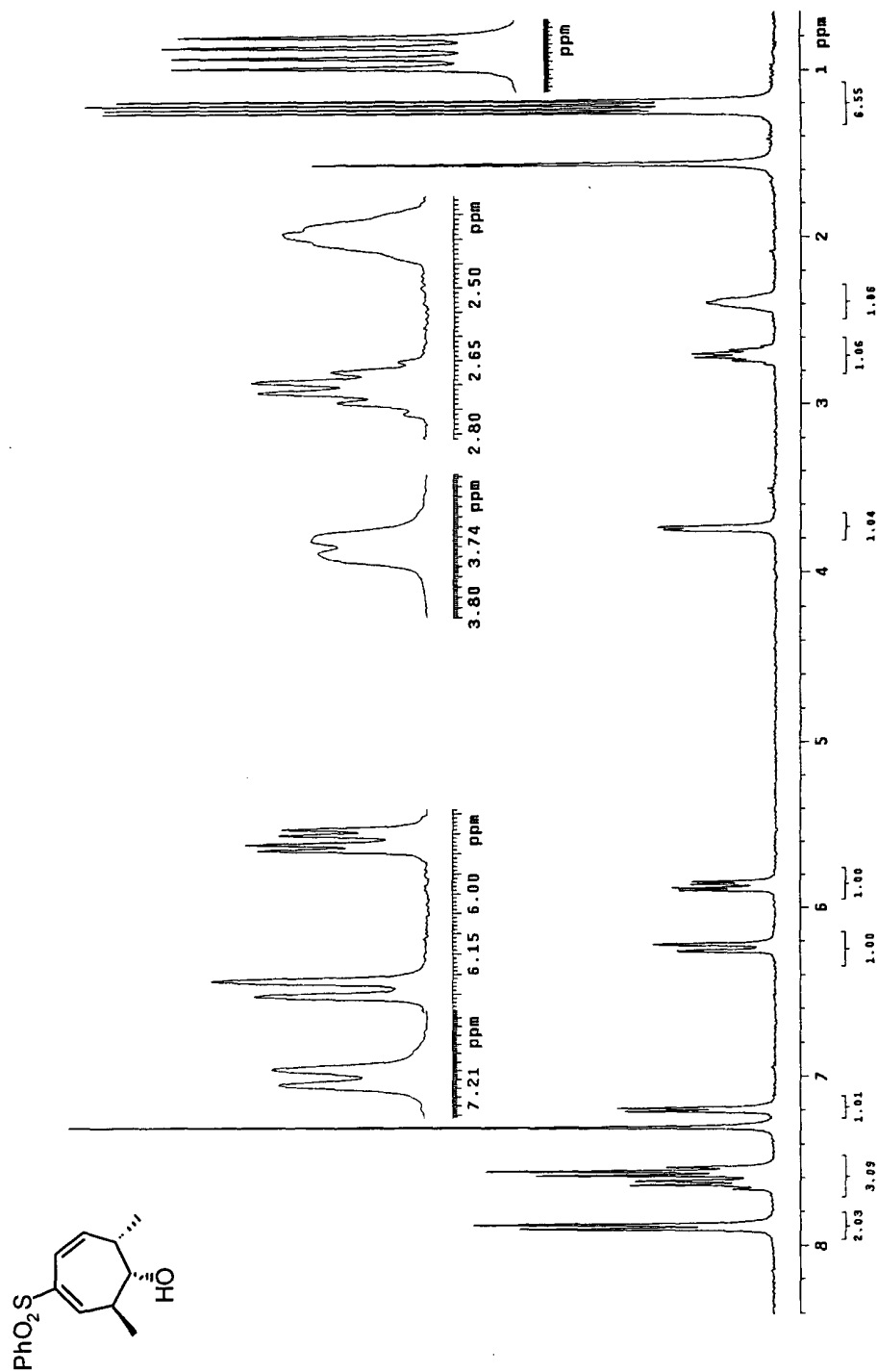


FIGURE 8 (Cont'd)



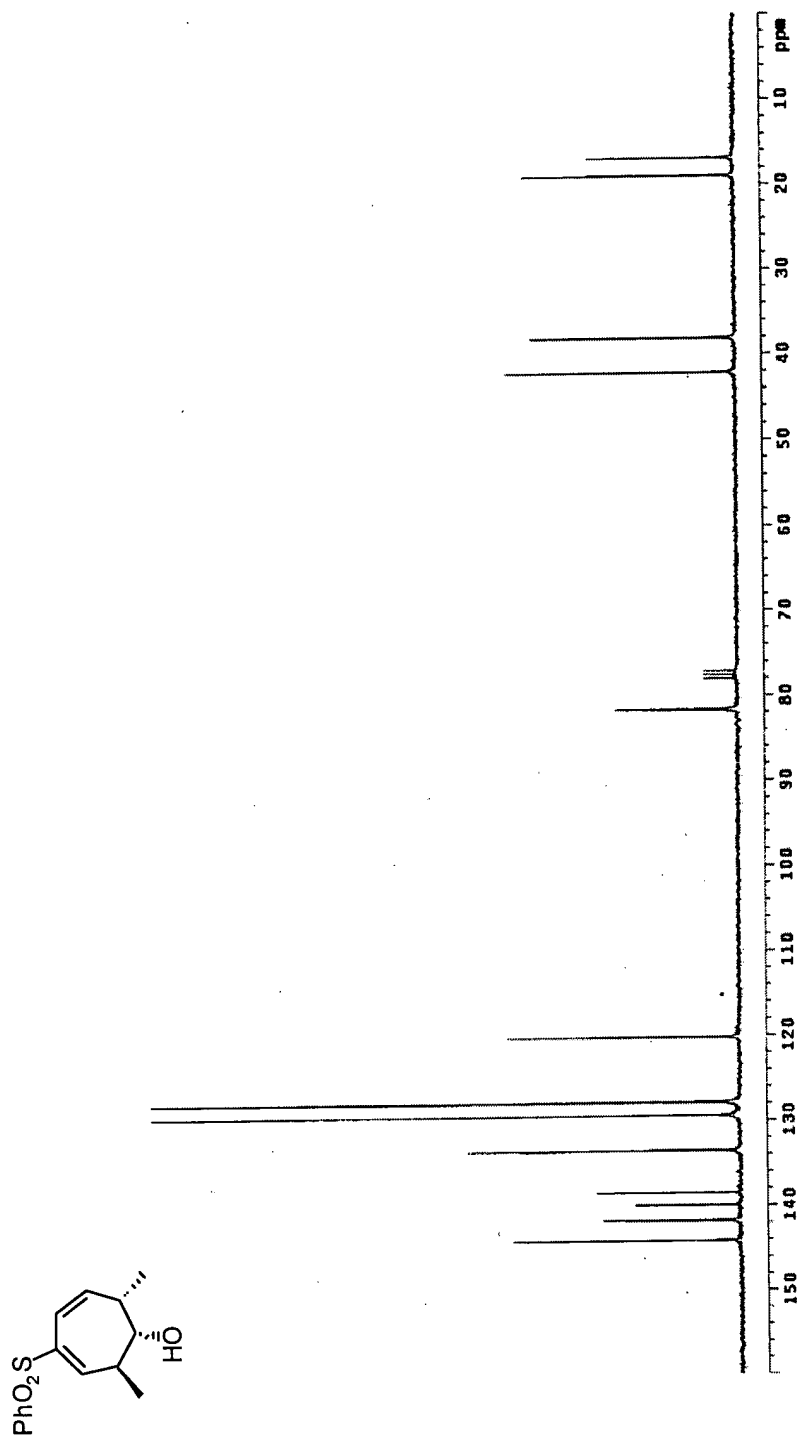
75MHz ¹³C NMR of compound 31 in CDCl₃

FIGURE 8 (Cont'd)

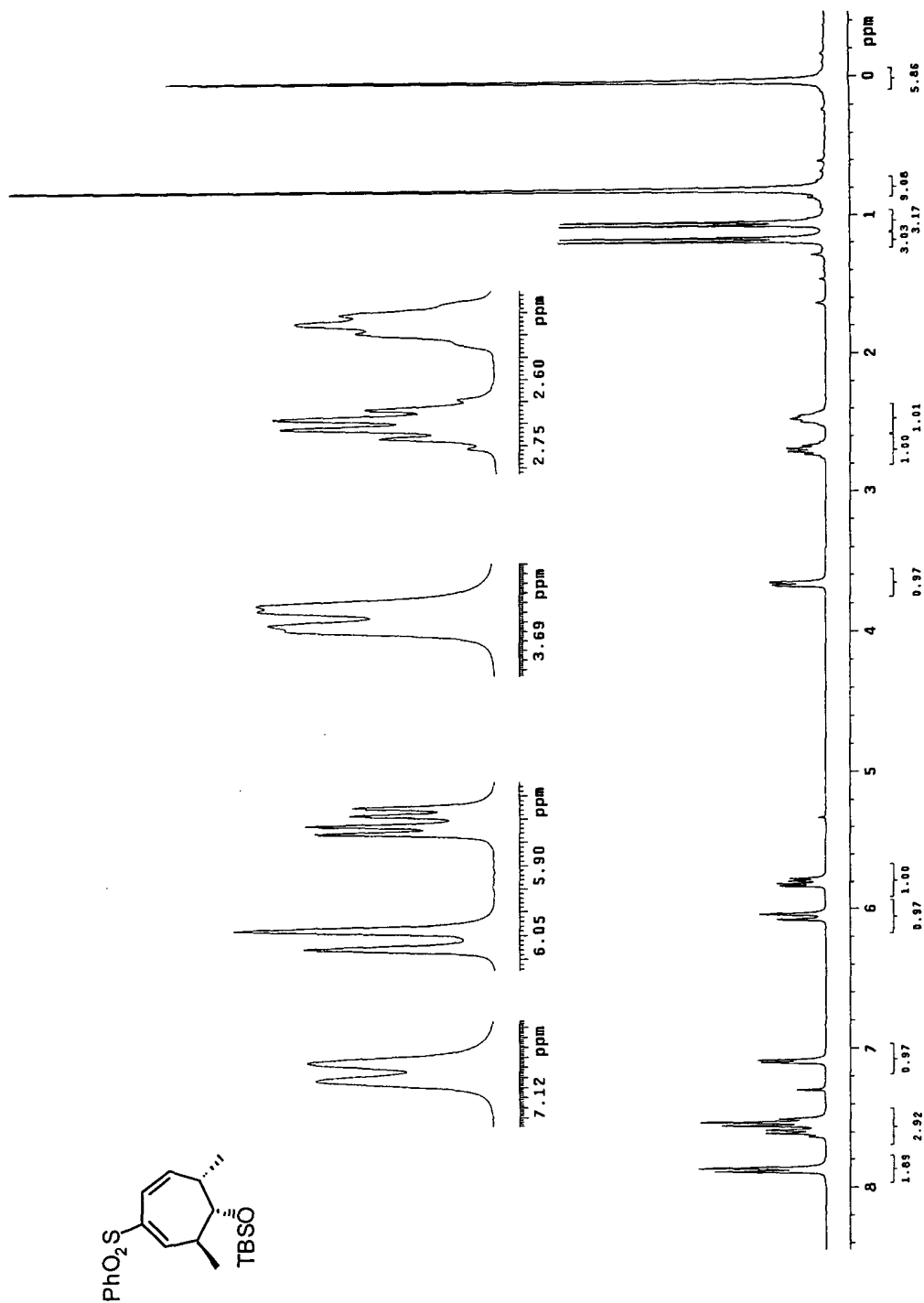


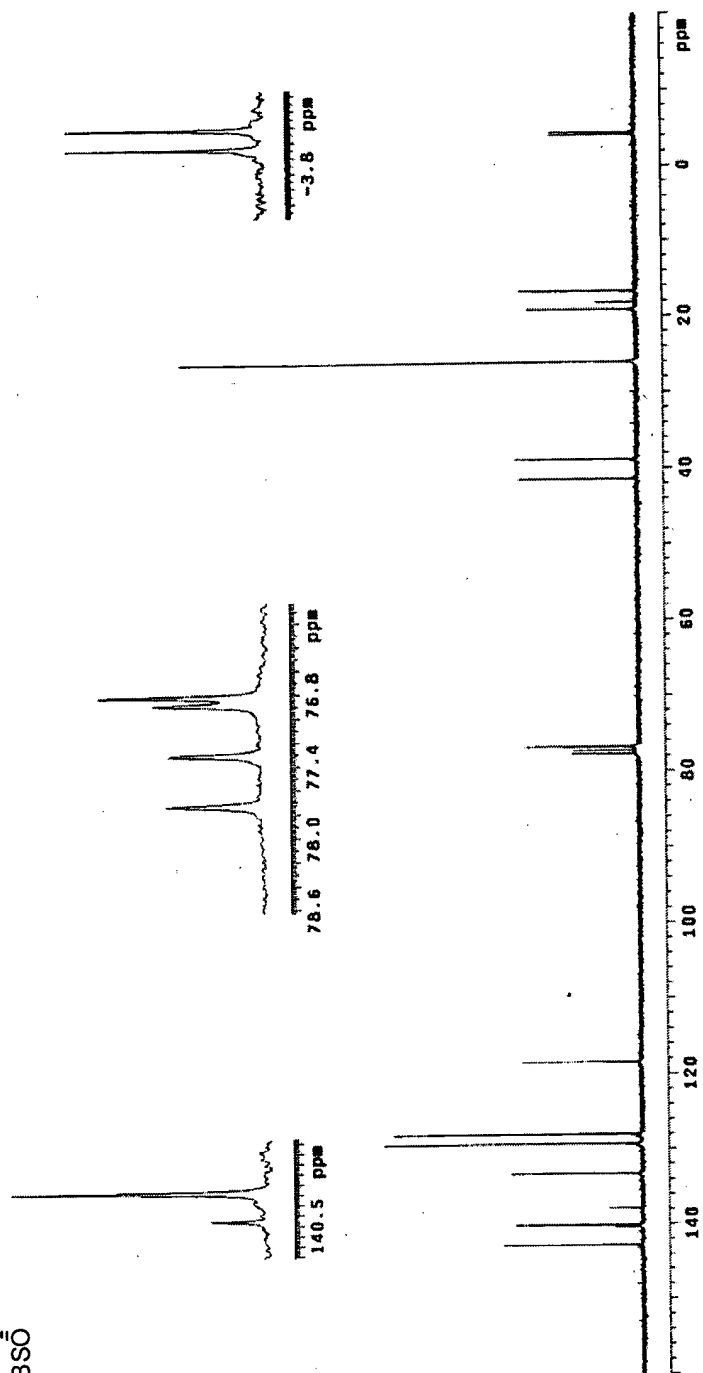
300MHz ^1H NMR of compound 32 in CDCl_3

FIGURE 8 (Cont'd)



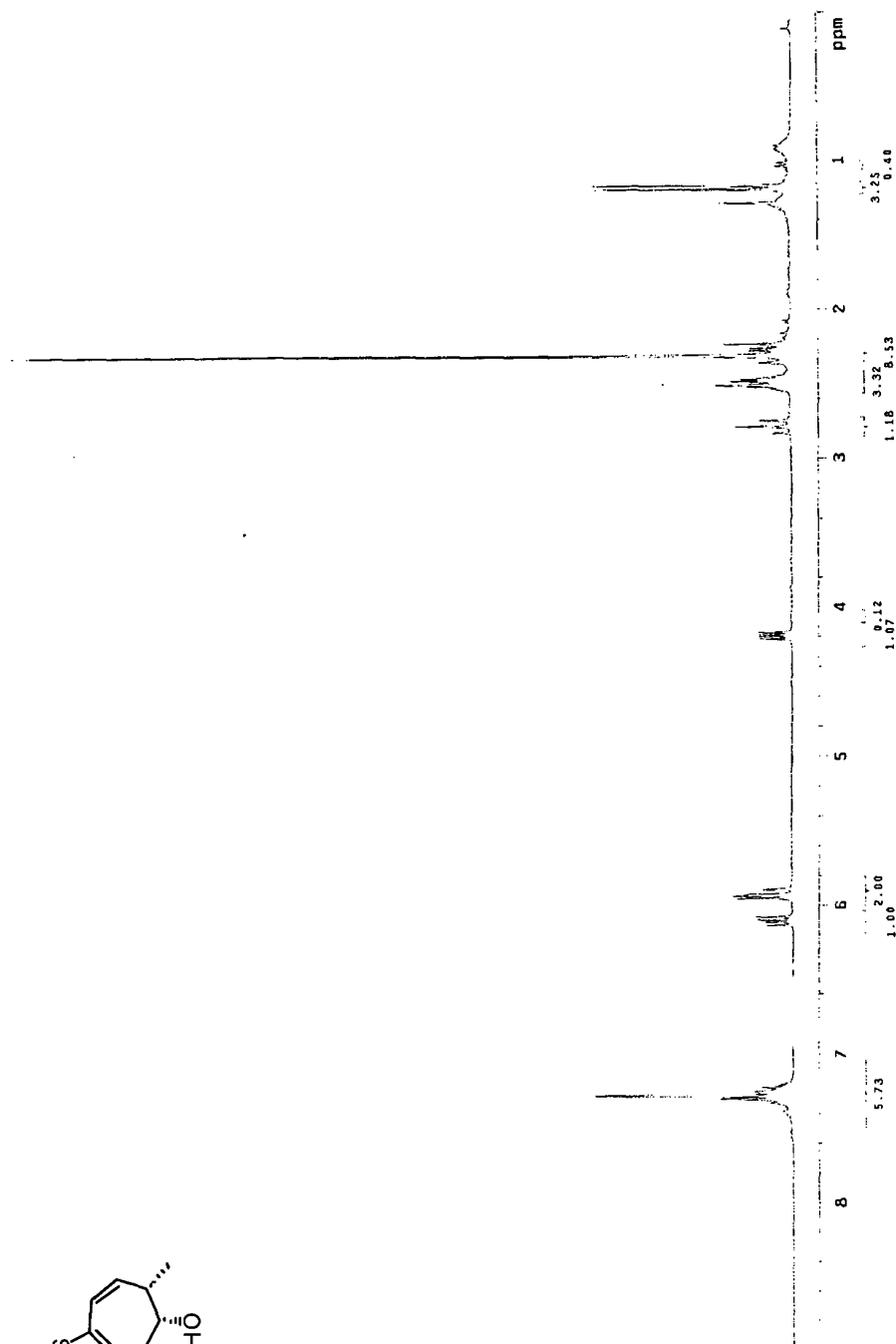
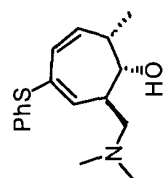
75MHz ^{13}C NMR of compound 32 in CDCl_3

300MHz ¹H NMR of compound 33 in CDCl₃

C[C@H]1C=C(C=C1)C(=O)O[C@H]1C=C(C=C1)C(=O)O

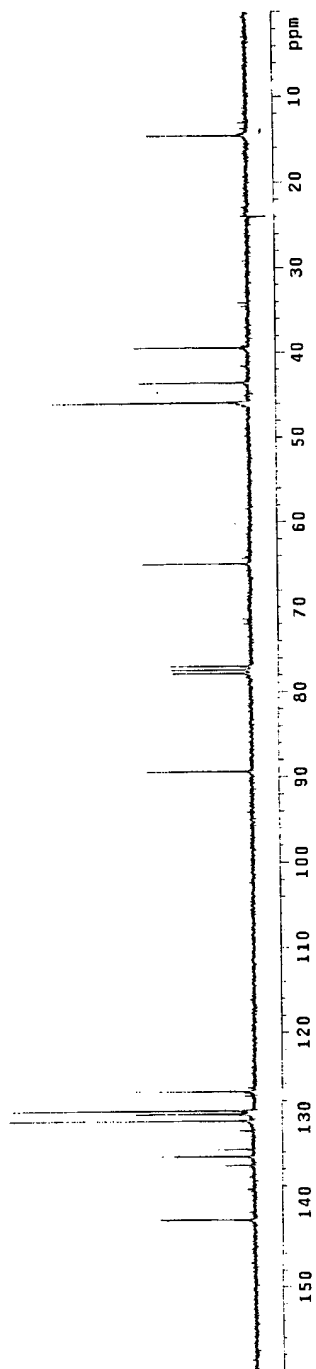
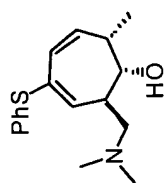
75MHz ^{13}C NMR of compound 33 in CDCl_3

FIGURE 8 (Cont'd)



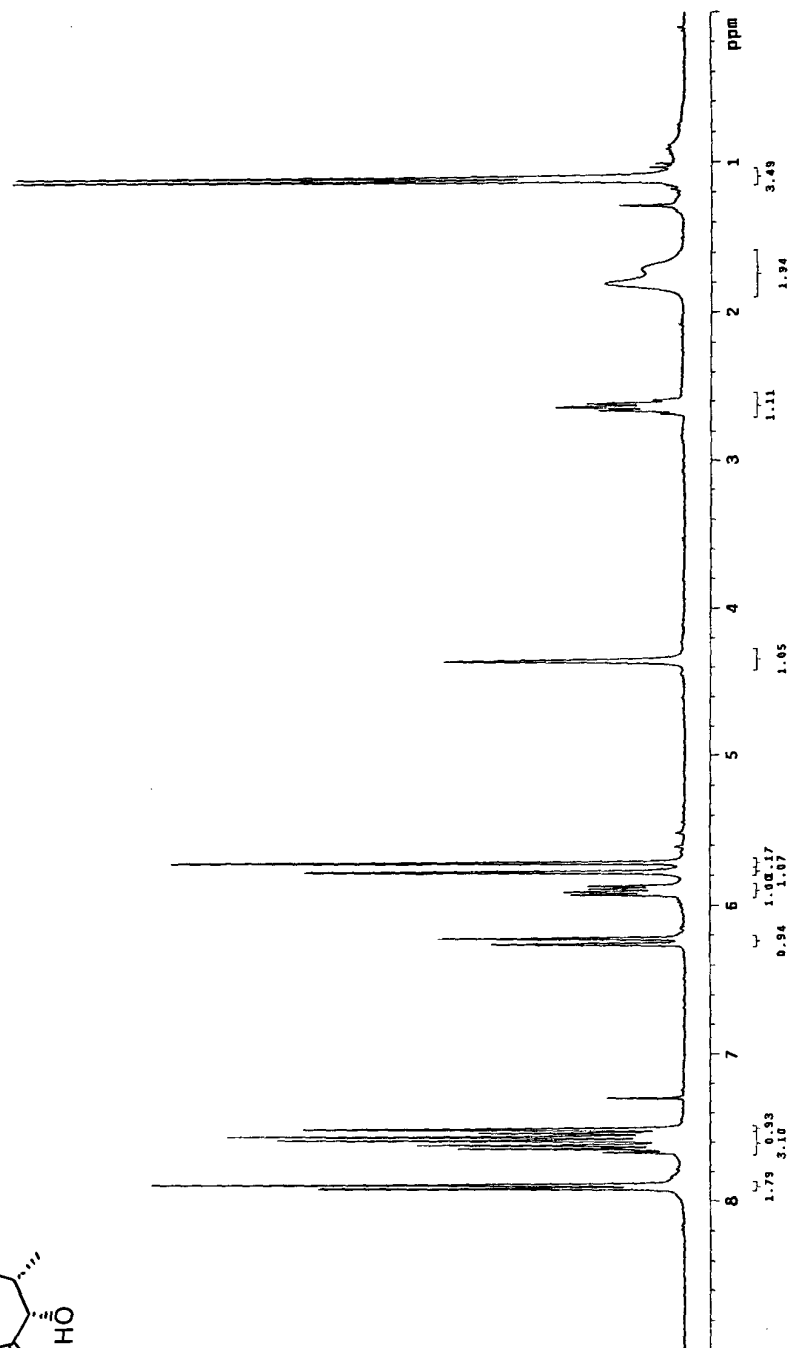
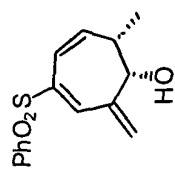
300MHz ¹H NMR of compound 34 in CDCl₃

FIGURE 8 (Cont'd)



75MHz ¹³C NMR of compound 34 in CDCl₃

FIGURE 8 (Cont'd)



300MHz ^1H NMR of compound 35 in CDCl_3

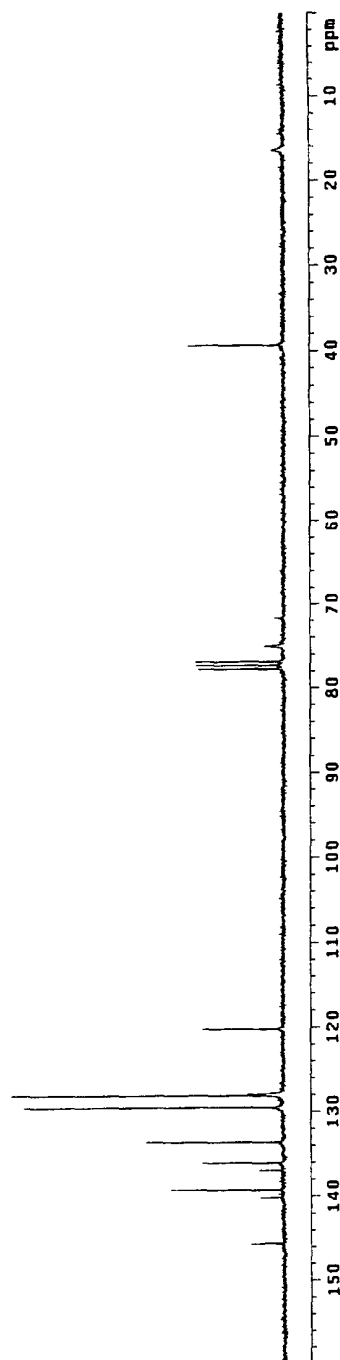
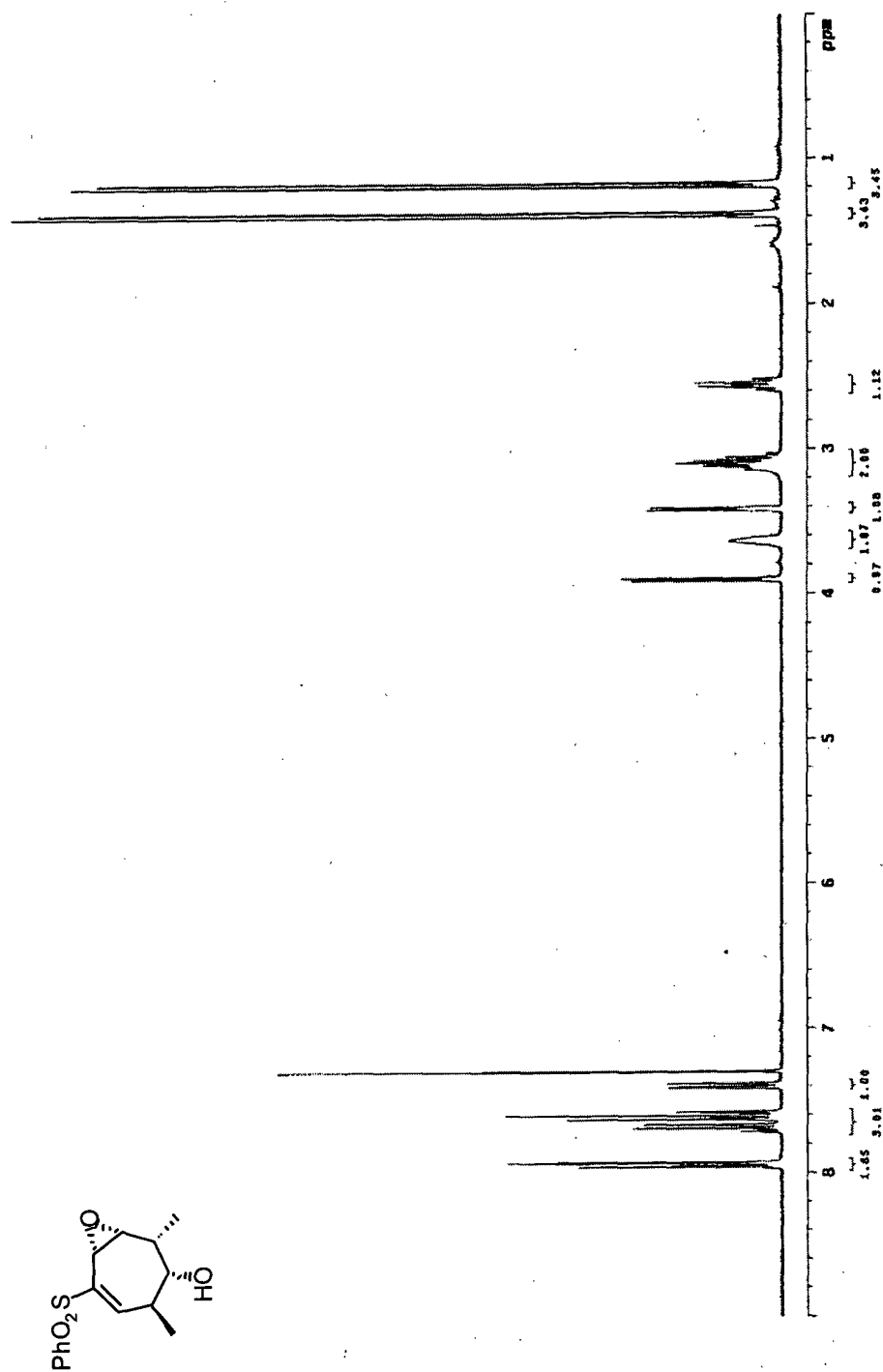
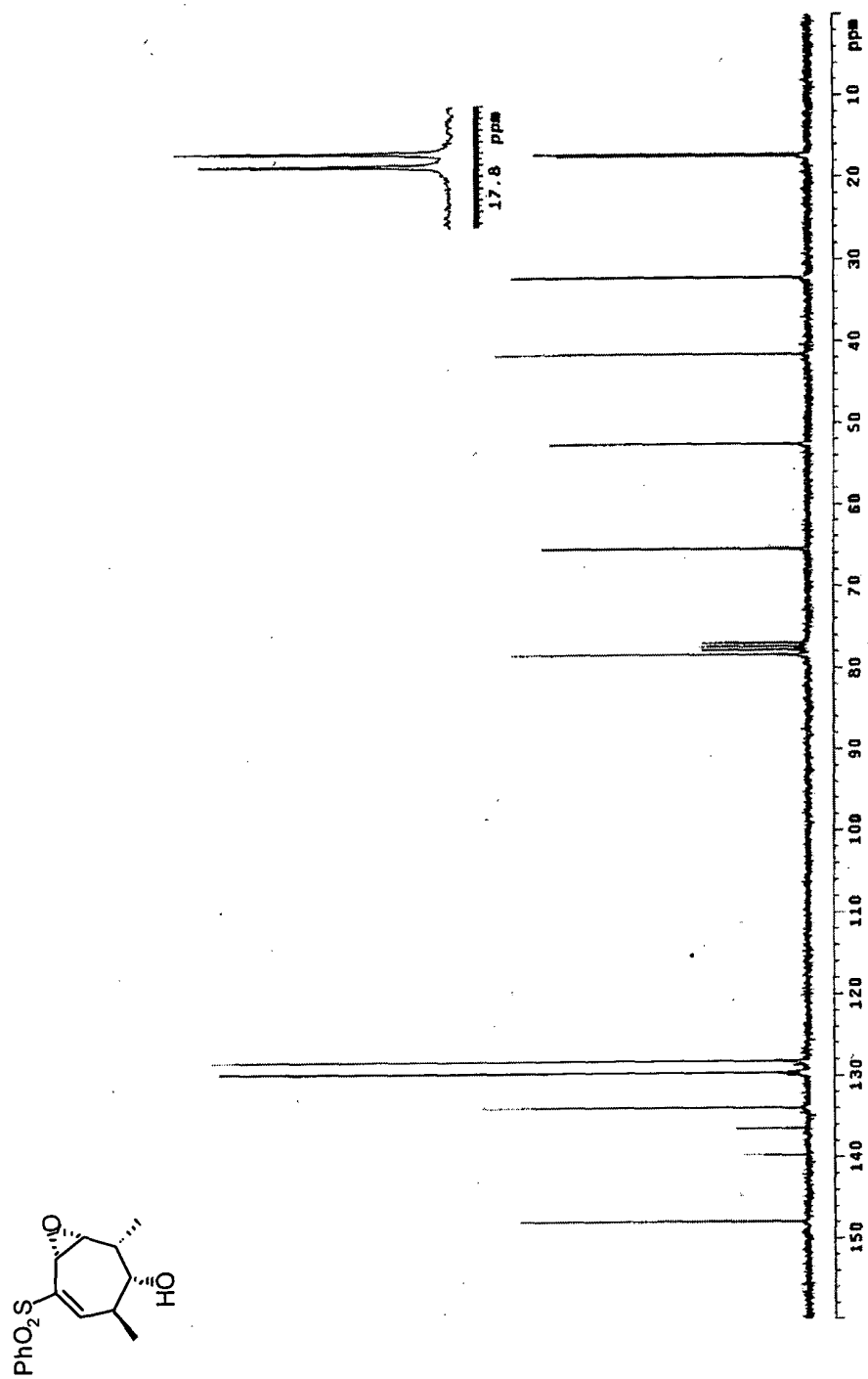
C=C1C(C=C(C=C1)S(=O)(=O)c2ccccc2)[C@H](O)C75MHz ^{13}C NMR of compound 35 in CDCl_3

FIGURE 8 (Cont'd)



300MHz ^1H NMR of compound $\alpha 36$ in CDCl_3

FIGURE 8 (Cont'd)



75MHz ^{13}C NMR of compound $\alpha 36$ in CDCl_3

FIGURE 8 (Cont'd)

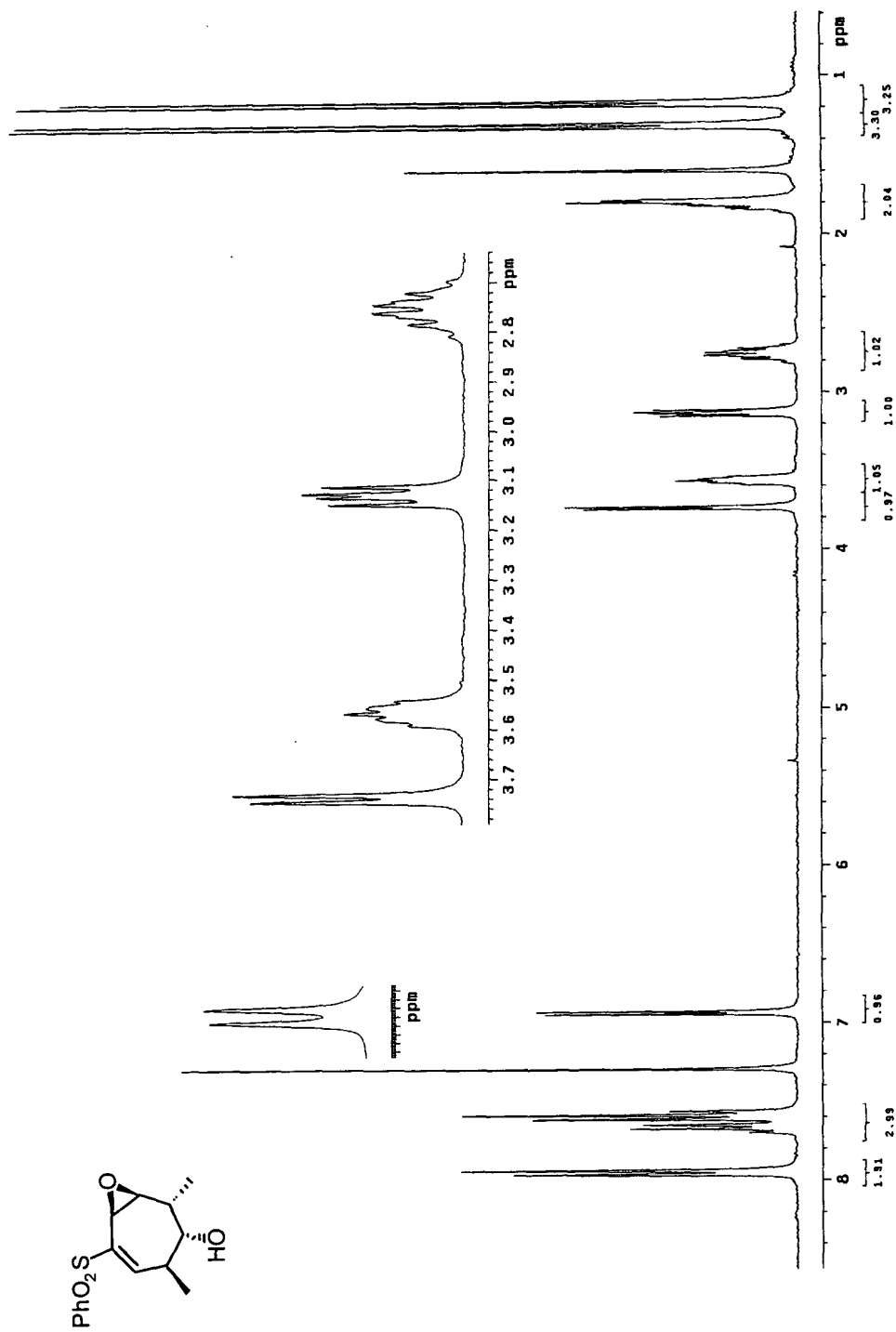
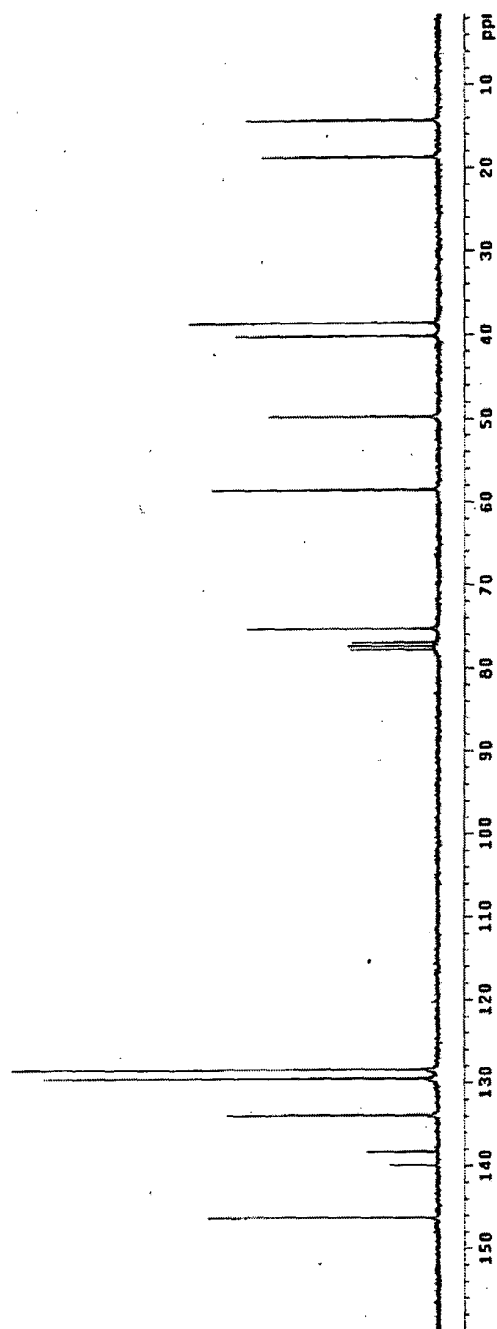
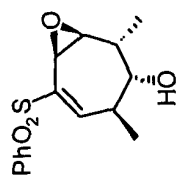


FIGURE 8 (Cont'd)



75MHz ^{13}C NMR of compound 36 in CDCl_3

FIGURE 8 (Cont'd)

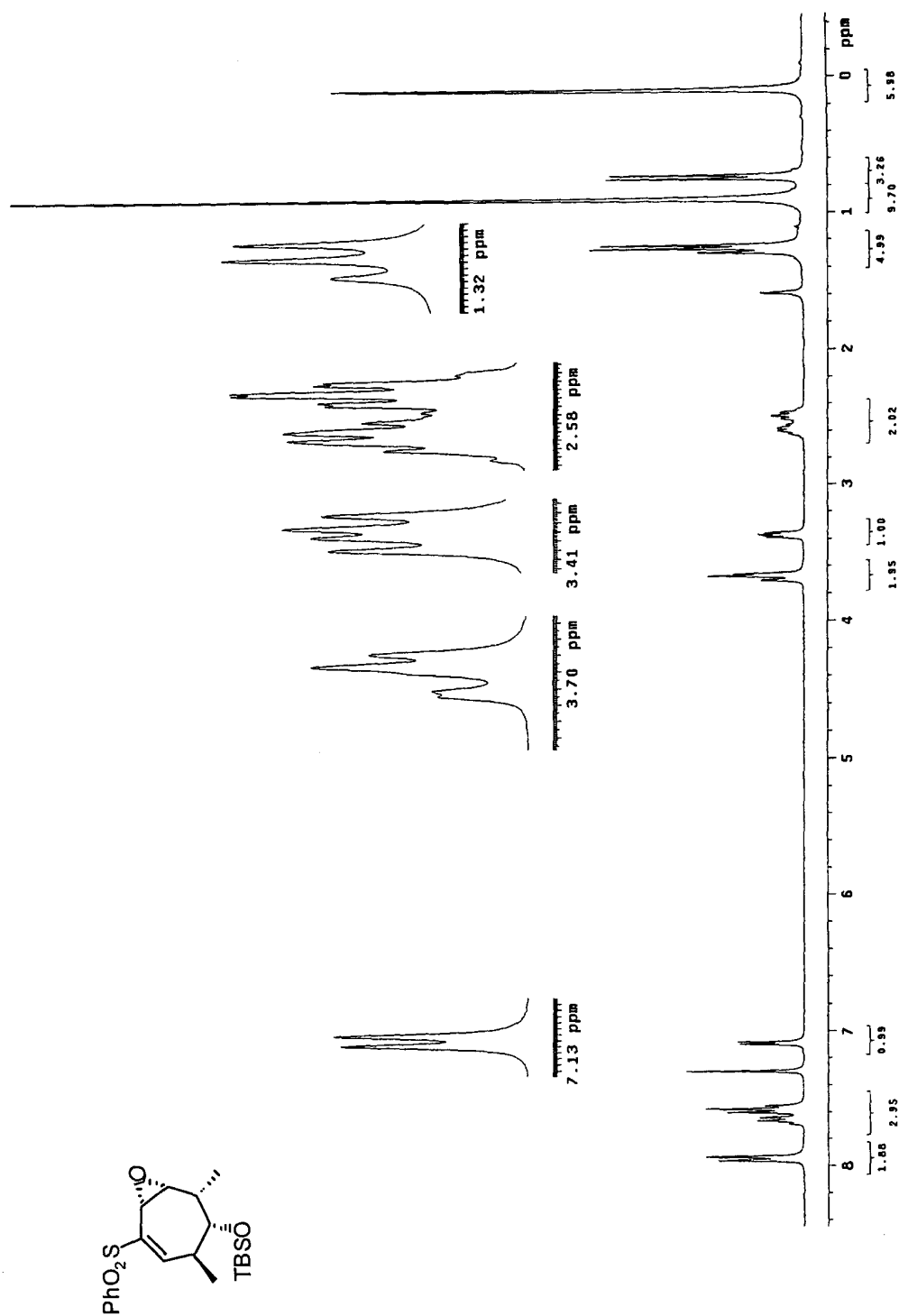
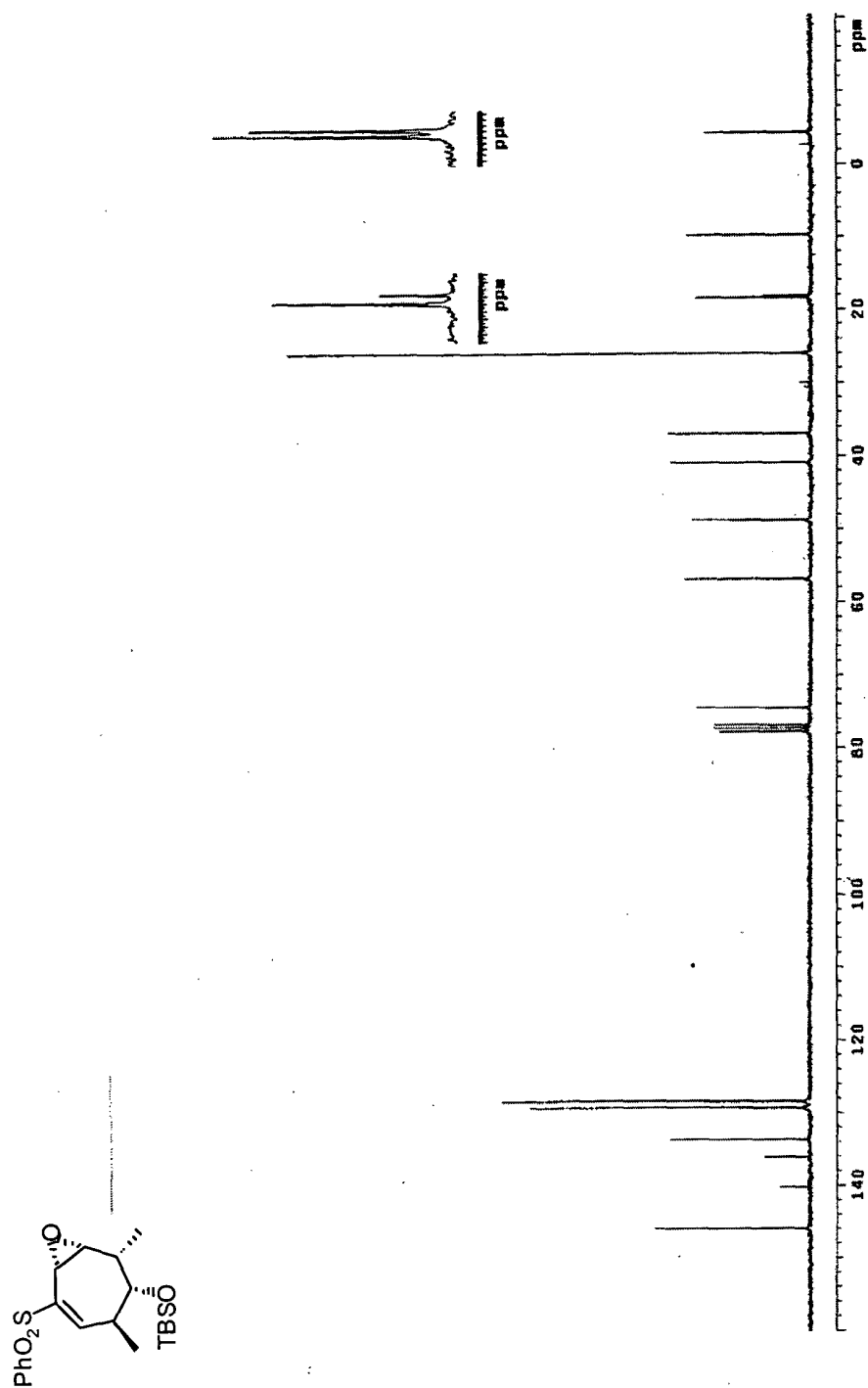
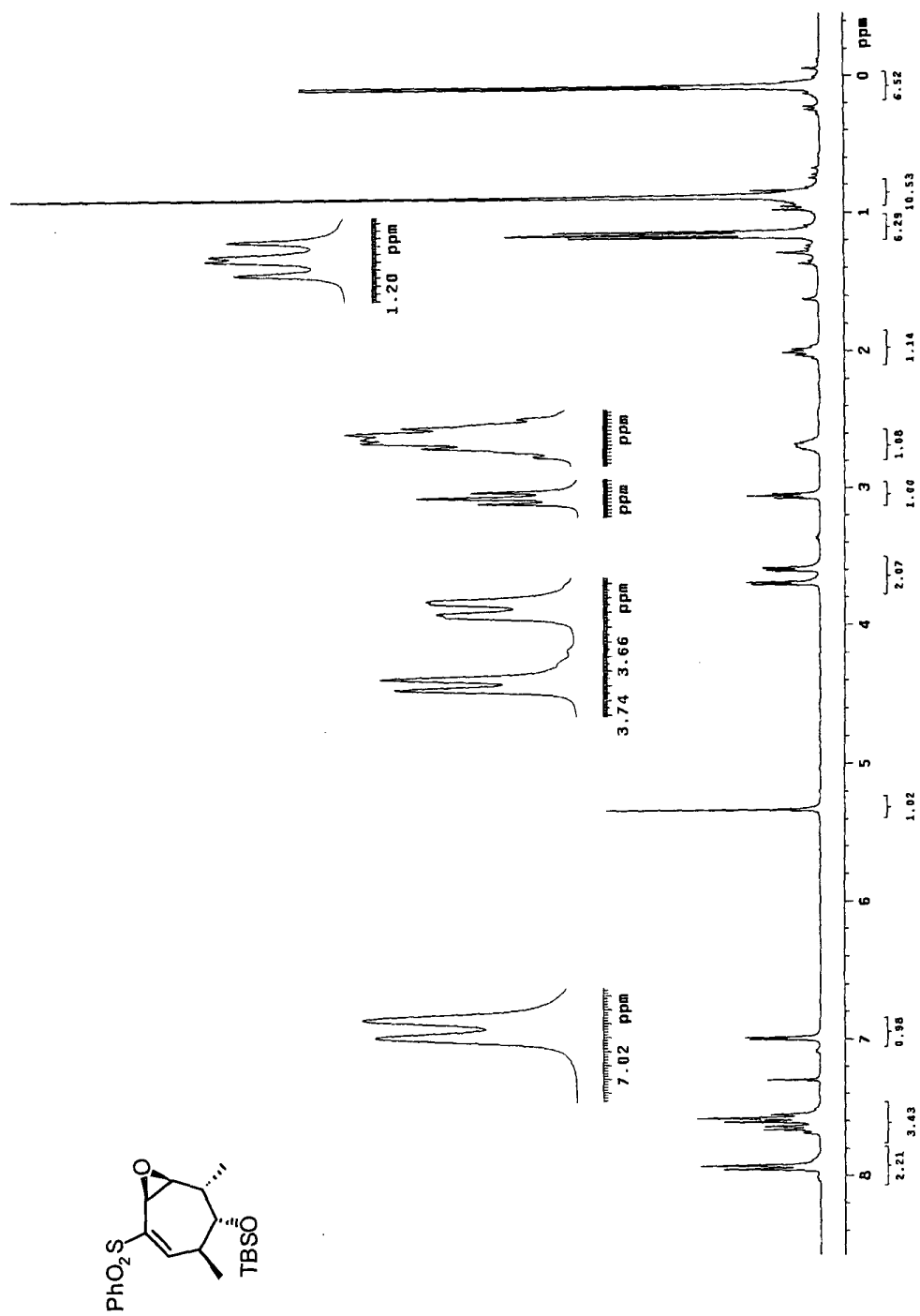
300MHz ¹H NMR of compound α37 in CDCl₃

FIGURE 8 (Cont'd)



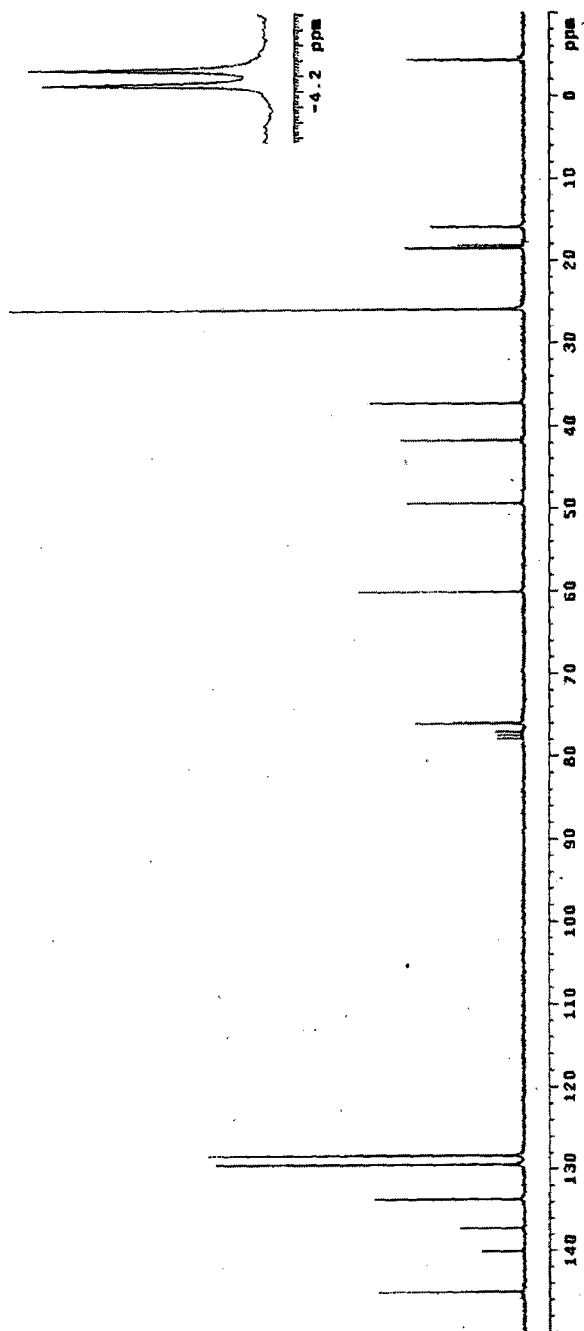
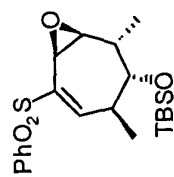
75MHz ^{13}C NMR of compound $\alpha 37$ in CDCl_3

FIGURE 8 (Cont'd)



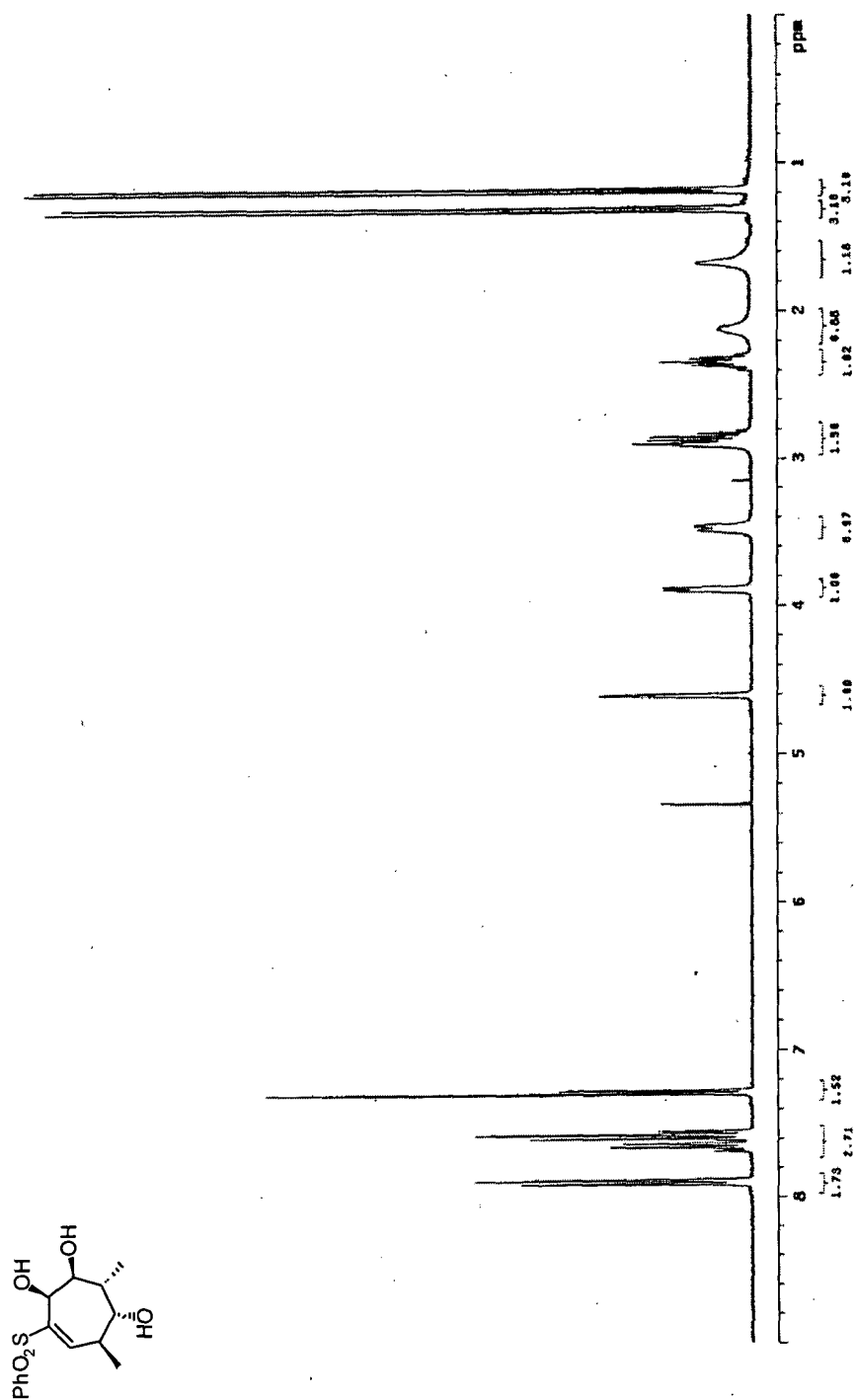
300MHz ^1H NMR of compound $\beta 37$ in CDCl_3

FIGURE 8 (Cont'd)



75MHz ^{13}C NMR of compound 37 in CDCl_3

FIGURE 8 (Cont'd)



300MHz ^1H NMR of compound **38** in CDCl_3

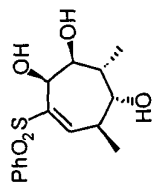
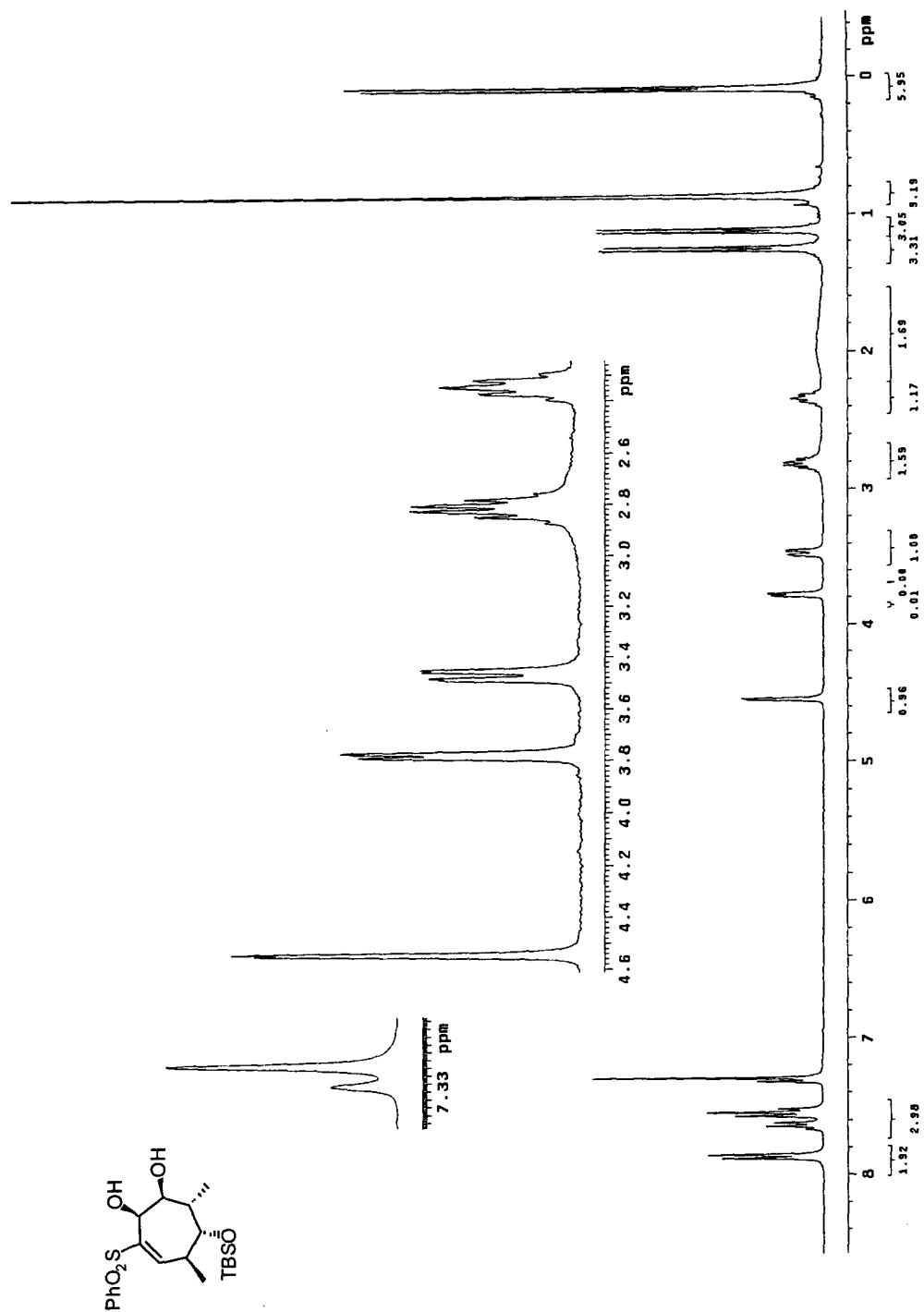
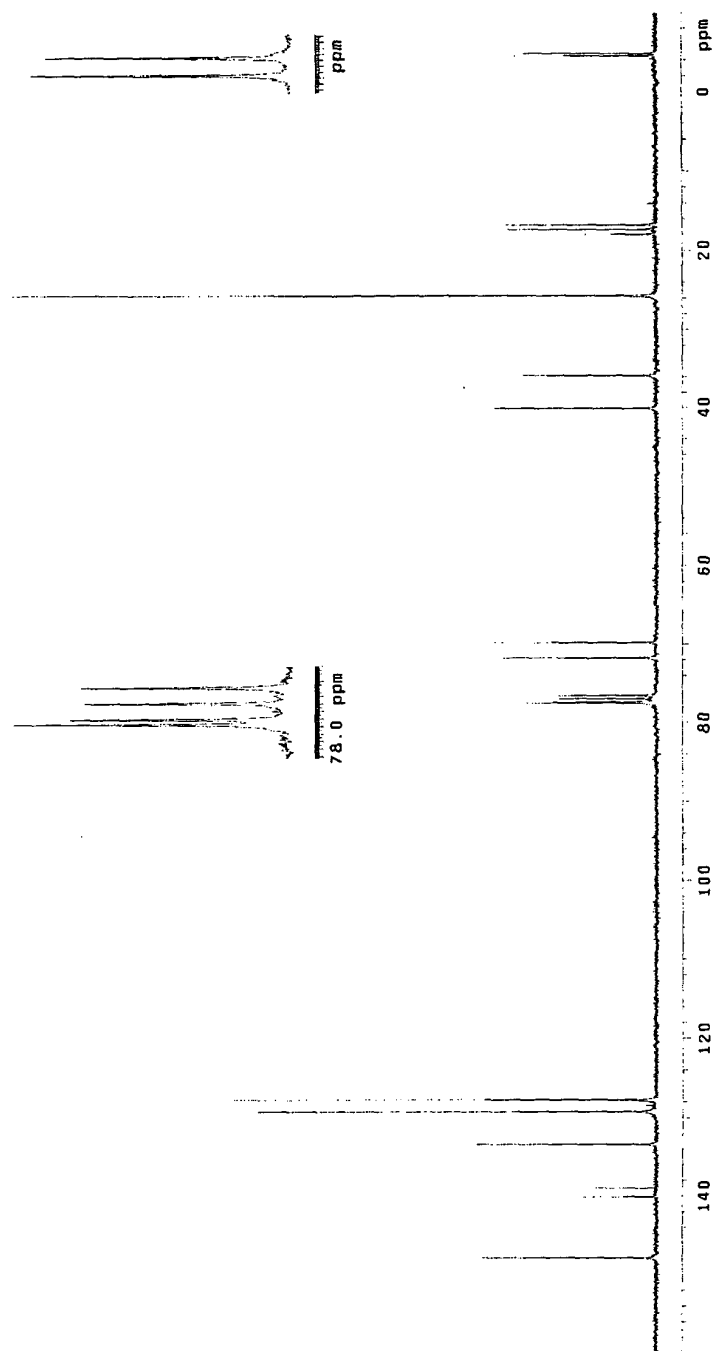
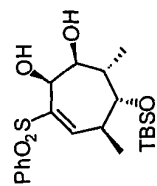
75MHz ¹³C NMR of compound 38 in CDCl₃

FIGURE 8 (Cont'd)



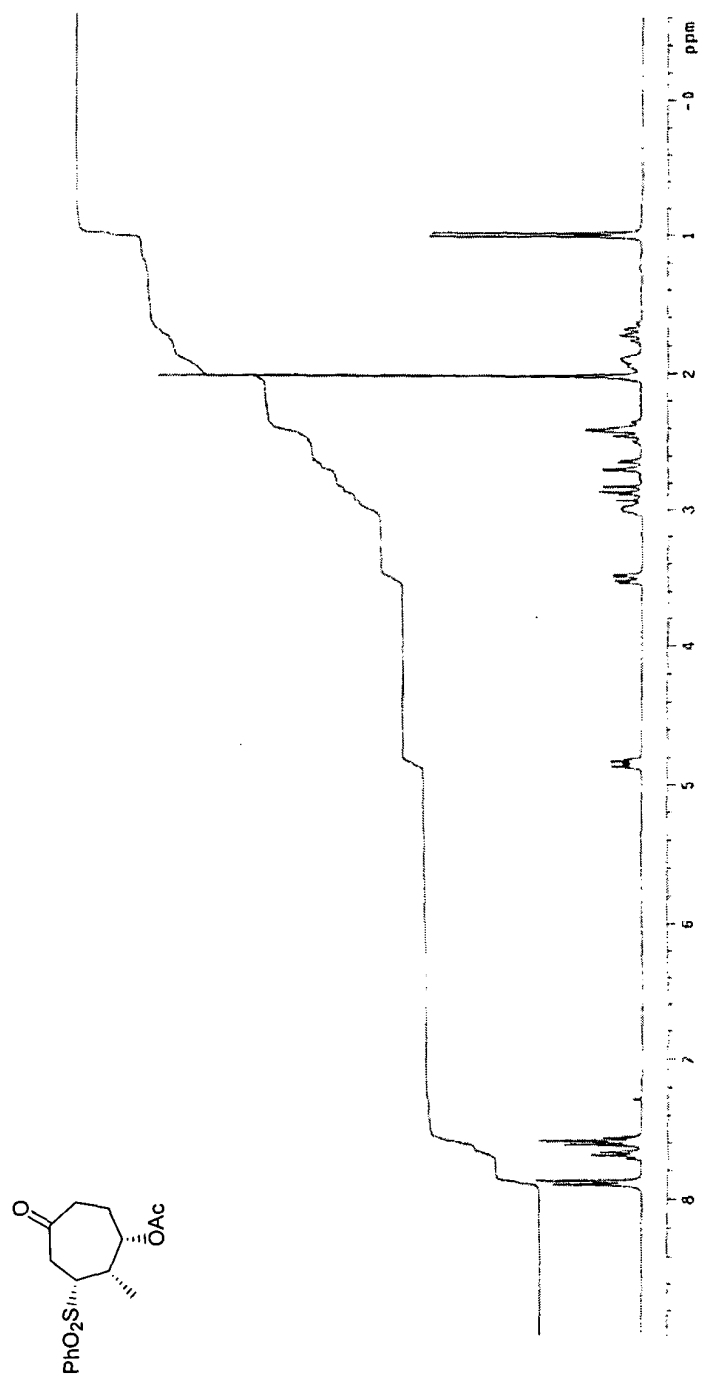
300MHz ^1H NMR of compound 39 in CDCl_3

FIGURE 8 (Cont'd)



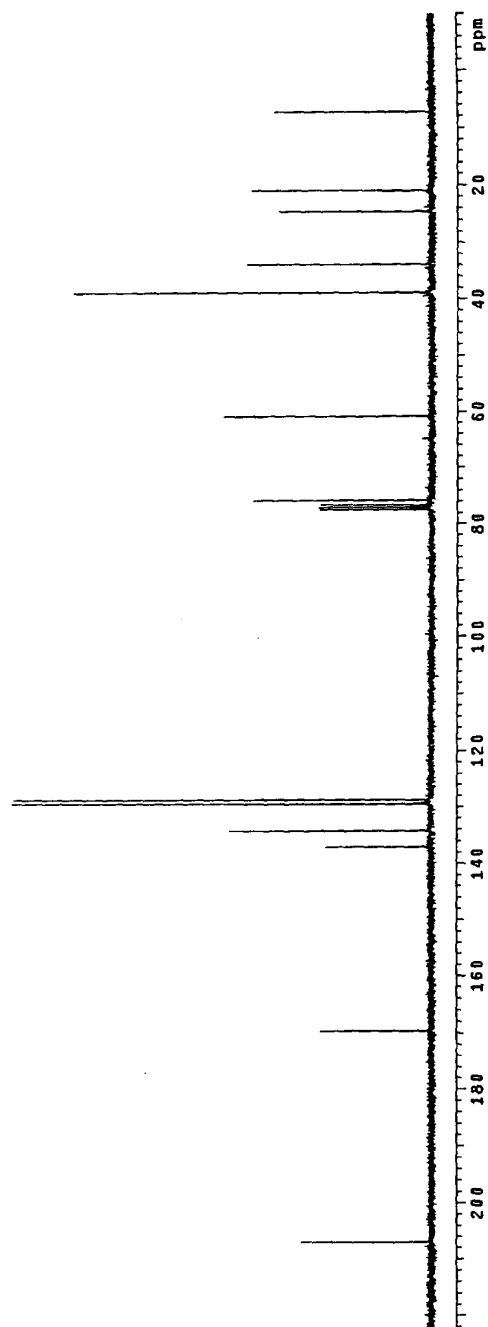
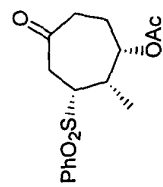
75MHz ^{13}C NMR of compound 39 in CDCl_3

FIGURE 8 (Cont'd)



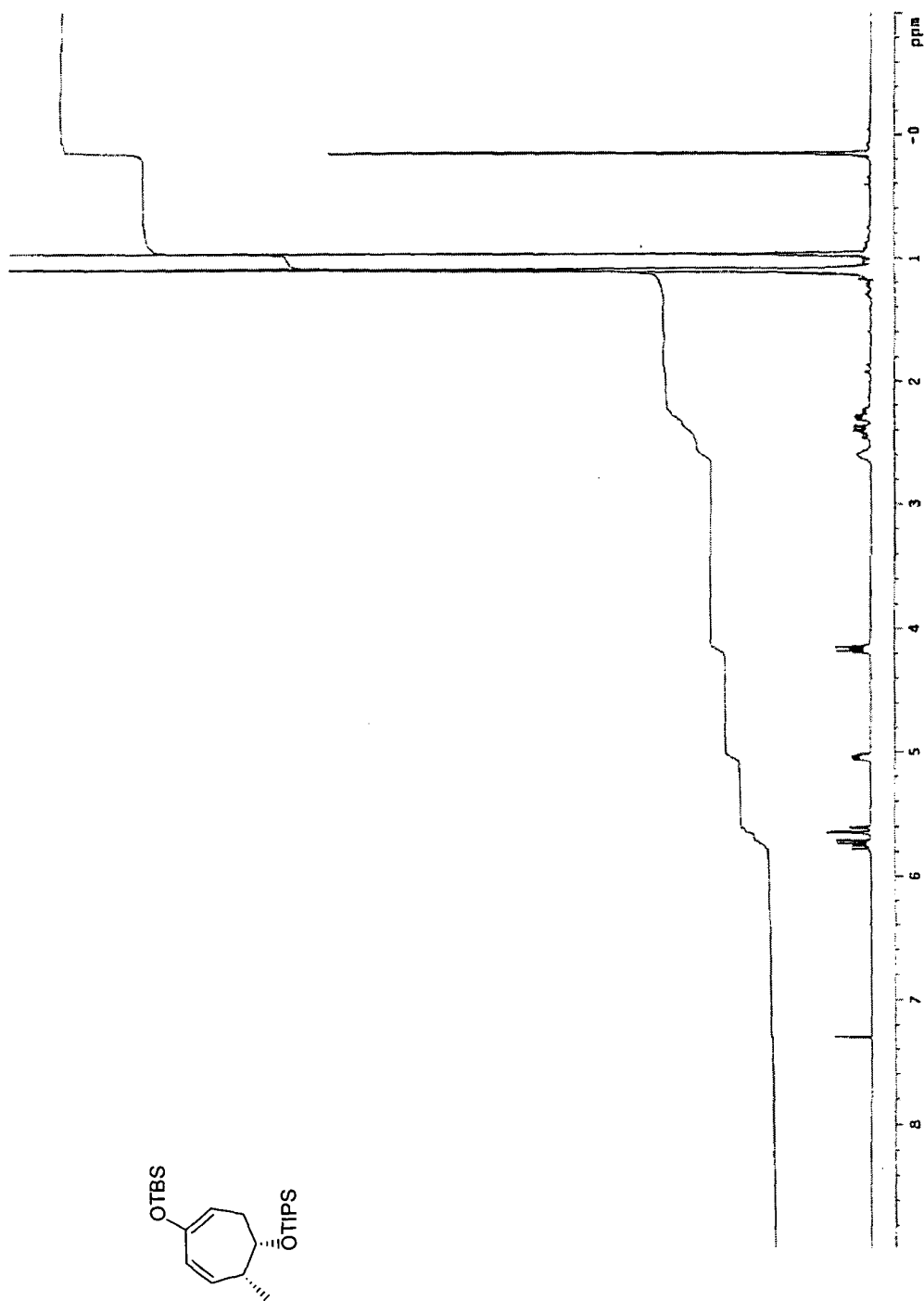
300MHz ^1H NMR of compound 41 in CDCl_3

FIGURE 8 (Cont'd)



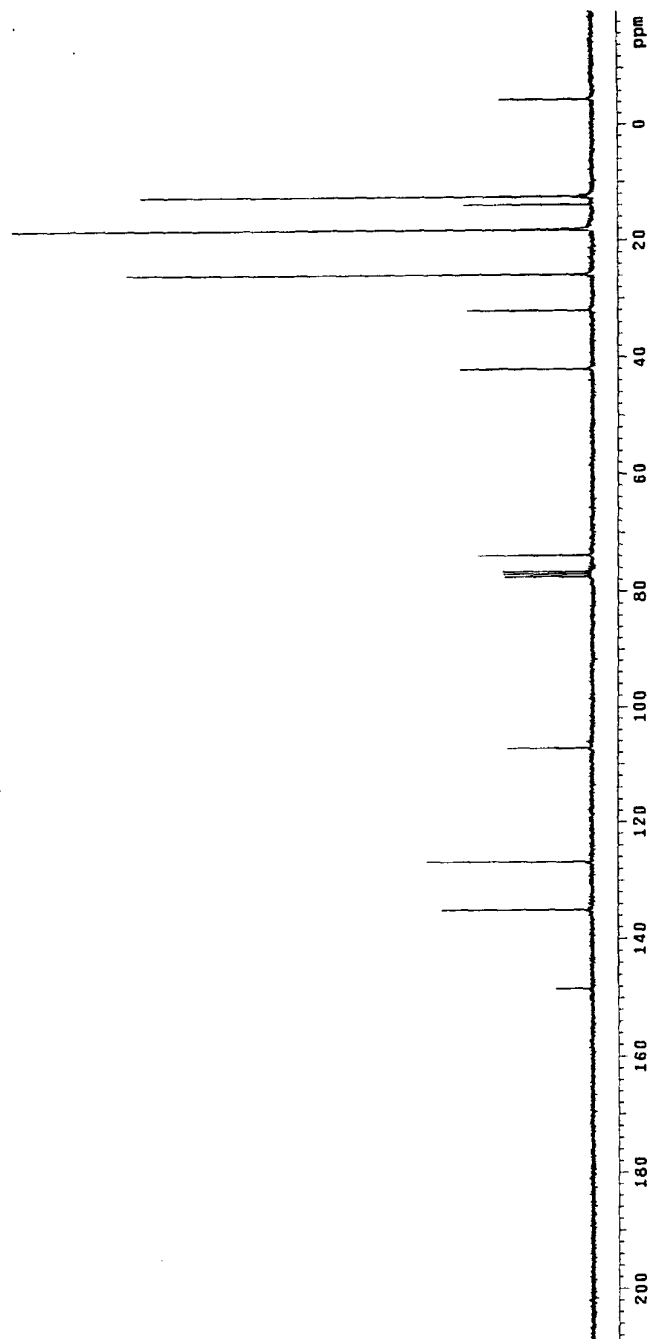
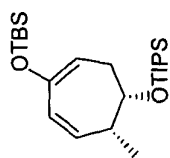
75MHz ^{13}C NMR of compound 41 in CDCl_3

FIGURE 8 (Cont'd)



300MHz ¹H NMR of compound 42 in CDCl₃

FIGURE 8 (Cont'd)

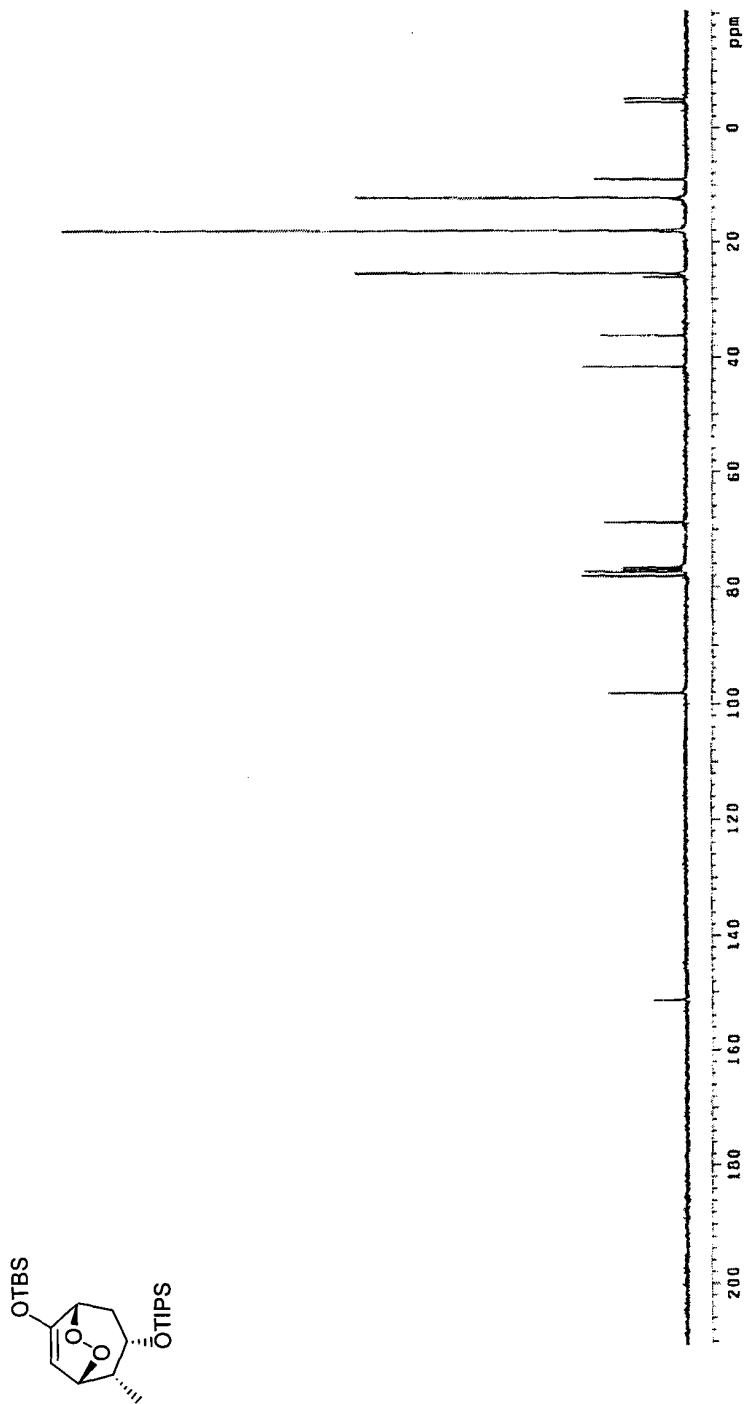


75MHz ¹³C NMR of compound 42 in CDCl₃

Chemical structure of the compound is shown below:

C1=CC(=C(C=C1)C2=CC=CC=C2)C3=CC=CC=C3C4=CC=CC=C4C5=CC=CC=C5C6=CC=CC=C6C7=CC=CC=C7C8=CC=CC=C8C9=CC=CC=C9C10=CC=CC=C10C11=CC=CC=C11C12=CC=CC=C12C13=CC=CC=C13C14=CC=CC=C14C15=CC=CC=C15C16=CC=CC=C16C17=CC=CC=C17C18=CC=CC=C18C19=CC=CC=C19C20=CC=CC=C20C21=CC=CC=C21C22=CC=CC=C22C23=CC=CC=C23C24=CC=CC=C24C25=CC=CC=C25C26=CC=CC=C26C27=CC=CC=C27C28=CC=CC=C28C29=CC=CC=C29C30=CC=CC=C30C31=CC=CC=C31C32=CC=CC=C32C33=CC=CC=C33C34=CC=CC=C34C35=CC=CC=C35C36=CC=CC=C36C37=CC=CC=C37C38=CC=CC=C38C39=CC=CC=C39C40=CC=CC=C40C41=CC=CC=C41C42=CC=CC=C42C43=CC=CC=C43C44=CC=CC=C44C45=CC=CC=C45C46=CC=CC=C46C47=CC=CC=C47C48=CC=CC=C48C49=CC=CC=C49C50=CC=CC=C50C51=CC=CC=C51C52=CC=CC=C52C53=CC=CC=C53C54=CC=CC=C54C55=CC=CC=C55C56=CC=CC=C56C57=CC=CC=C57C58=CC=CC=C58C59=CC=CC=C59C60=CC=CC=C60C61=CC=CC=C61C62=CC=CC=C62C63=CC=CC=C63C64=CC=CC=C64C65=CC=CC=C65C66=CC=CC=C66C67=CC=CC=C67C68=CC=CC=C68C69=CC=CC=C69C70=CC=CC=C70C71=CC=CC=C71C72=CC=CC=C72C73=CC=CC=C73C74=CC=CC=C74C75=CC=CC=C75C76=CC=CC=C76C77=CC=CC=C77C78=CC=CC=C78C79=CC=CC=C79C80=CC=CC=C80C81=CC=CC=C81C82=CC=CC=C82C83=CC=CC=C83C84=CC=CC=C84C85=CC=CC=C85C86=CC=CC=C86C87=CC=CC=C87C88=CC=CC=C88C89=CC=CC=C89C90=CC=CC=C90C91=CC=CC=C91C92=CC=CC=C92C93=CC=CC=C93C94=CC=CC=C94C95=CC=CC=C95C96=CC=CC=C96C97=CC=CC=C97C98=CC=CC=C98C99=CC=CC=C99C100=CC=CC=C100C101=CC=CC=C101C102=CC=CC=C102C103=CC=CC=C103C104=CC=CC=C104C105=CC=CC=C105C106=CC=CC=C106C107=CC=CC=C107C108=CC=CC=C108C109=CC=CC=C109C110=CC=CC=C110C111=CC=CC=C111C112=CC=CC=C112C113=CC=CC=C113C114=CC=CC=C114C115=CC=CC=C115C116=CC=CC=C116C117=CC=CC=C117C118=CC=CC=C118C119=CC=CC=C119C120=CC=CC=C120C121=CC=CC=C121C122=CC=CC=C122C123=CC=CC=C123C124=CC=CC=C124C125=CC=CC=C125C126=CC=CC=C126C127=CC=CC=C127C128=CC=CC=C128C129=CC=CC=C129C130=CC=CC=C130C131=CC=CC=C131C132=CC=CC=C132C133=CC=CC=C133C134=CC=CC=C134C135=CC=CC=C135C136=CC=CC=C136C137=CC=CC=C137C138=CC=CC=C138C139=CC=CC=C139C140=CC=CC=C140C141=CC=CC=C141C142=CC=CC=C142C143=CC=CC=C143C144=CC=CC=C144C145=CC=CC=C145C146=CC=CC=C146C147=CC=CC=C147C148=CC=CC=C148C149=CC=CC=C149C150=CC=CC=C150C151=CC=CC=C151C152=CC=CC=C152C153=CC=CC=C153C154=CC=CC=C154C155=CC=CC=C155C156=CC=CC=C156C157=CC=CC=C157C158=CC=CC=C158C159=CC=CC=C159C160=CC=CC=C160C161=CC=CC=C161C162=CC=CC=C162C163=CC=CC=C163C164=CC=CC=C164C165=CC=CC=C165C166=CC=CC=C166C167=CC=CC=C167C168=CC=CC=C168C169=CC=CC=C169C170=CC=CC=C170C171=CC=CC=C171C172=CC=CC=C172C173=CC=CC=C173C174=CC=CC=C174C175=CC=CC=C175C176=CC=CC=C176C177=CC=CC=C177C178=CC=CC=C178C179=CC=CC=C179C180=CC=CC=C180C181=CC=CC=C181C182=CC=CC=C182C183=CC=CC=C183C184=CC=CC=C184C185=CC=CC=C185C186=CC=CC=C186C187=CC=CC=C187C188=CC=CC=C188C189=CC=CC=C189C190=CC=CC=C190C191=CC=CC=C191C192=CC=CC=C192C193=CC=CC=C193C194=CC=CC=C194C195=CC=CC=C195C196=CC=CC=C196C197=CC=CC=C197C198=CC=CC=C198C199=CC=CC=C199C200=CC=CC=C200C201=CC=CC=C201C202=CC=CC=C202C203=CC=CC=C203C204=CC=CC=C204C205=CC=CC=C205C206=CC=CC=C206C207=CC=CC=C207C208=CC=CC=C208C209=CC=CC=C209C210=CC=CC=C210C211=CC=CC=C211C212=CC=CC=C212C213=CC=CC=C213C214=CC=CC=C214C215=CC=CC=C215C216=CC=CC=C216C217=CC=CC=C217C218=CC=CC=C218C219=CC=CC=C219C220=CC=CC=C220C221=CC=CC=C221C222=CC=CC=C222C223=CC=CC=C223C224=CC=CC=C224C225=CC=CC=C225C226=CC=CC=C226C227=CC=CC=C227C228=CC=CC=C228C229=CC=CC=C229C230=CC=CC=C230C231=CC=CC=C231C232=CC=CC=C232C233=CC=CC=C233C234=CC=CC=C234C235=CC=CC=C235C236=CC=CC=C236C237=CC=CC=C237C238=CC=CC=C238C239=CC=CC=C239C240=CC=CC=C240C241=CC=CC=C241C242=CC=CC=C242C243=CC=CC=C243C244=CC=CC=C244C245=CC=CC=C245C246=CC=CC=C246C247=CC=CC=C247C248=CC=CC=C248C249=CC=CC=C249C250=CC=CC=C250C251=CC=CC=C251C252=CC=CC=C252C253=CC=CC=C253C254=CC=CC=C254C255=CC=CC=C255C256=CC=CC=C256C257=CC=CC=C257C258=CC=CC=C258C259=CC=CC=C259C260=CC=CC=C260C261=CC=CC=C261C262=CC=CC=C262C263=CC=CC=C263C264=CC=CC=C264C265=CC=CC=C265C266=CC=CC=C266C267=CC=CC=C267C268=CC=CC=C268C269=CC=CC=C269C270=CC=CC=C270C271=CC=CC=C271C272=CC=CC=C272C273=CC=CC=C273C274=CC=CC=C274C275=CC=CC=C275C276=CC=CC=C276C277=CC=CC=C277C278=CC=CC=C278C279=CC=CC=C279C280=CC=CC=C280C281=CC=CC=C281C282=CC=CC=C282C283=CC=CC=C283C284=CC=CC=C284C285=CC=CC=C285C286=CC=CC=C286C287=CC=CC=C287C288=CC=CC=C288C289=CC=CC=C289C290=CC=CC=C290C291=CC=CC=C291C292=CC=CC=C292C293=CC=CC=C293C294=CC=CC=C294C295=CC=CC=C295C296=CC=CC=C296C297=CC=CC=C297C298=CC=CC=C298C299=CC=CC=C299C300=CC=CC=C300C301=CC=CC=C301C302=CC=CC=C302C303=CC=CC=C303C304=CC=CC=C304C305=CC=CC=C305C306=CC=CC=C306C307=CC=CC=C307C308=CC=CC=C308C309=CC=CC=C309C310=CC=CC=C310C311=CC=CC=C311C312=CC=CC=C312C313=CC=CC=C313C314=CC=CC=C314C315=CC=CC=C315C316=CC=CC=C316C317=CC=CC=C317C318=CC=CC=C318C319=CC=CC=C319C320=CC=CC=C320C321=CC=CC=C321C322=CC=CC=C322C323=CC=CC=C323C324=CC=CC=C324C325=CC=CC=C325C326=CC=CC=C326C327=CC=CC=C327C328=CC=CC=C328C329=CC=CC=C329C330=CC=CC=C330C331=CC=CC=C331C332=CC=CC=C332C333=CC=CC=C333C334=CC=CC=C334C335=CC=CC=C335C336=CC=CC=C336C337=CC=CC=C337C338=CC=CC=C338C339=CC=CC=C339C340=CC=CC=C340C341=CC=CC=C341C342=CC=CC=C342C343=CC=CC=C343C344=CC=CC=C344C345=CC=CC=C345C346=CC=CC=C346C347=CC=CC=C347C348=CC=CC=C348C349=CC=CC=C349C350=CC=CC=C350C351=CC=CC=C351C352=CC=CC=C352C353=CC=CC=C353C354=CC=CC=C354C355=CC=CC=C355C356=CC=CC=C356C357=CC=CC=C357C358=CC=CC=C300MHz ^1H NMR of compound 43 in CDCl_3

FIGURE 8 (Cont'd)



75MHz ^{13}C NMR of compound 43 in CDCl_3

FIGURE 8 (Cont'd)

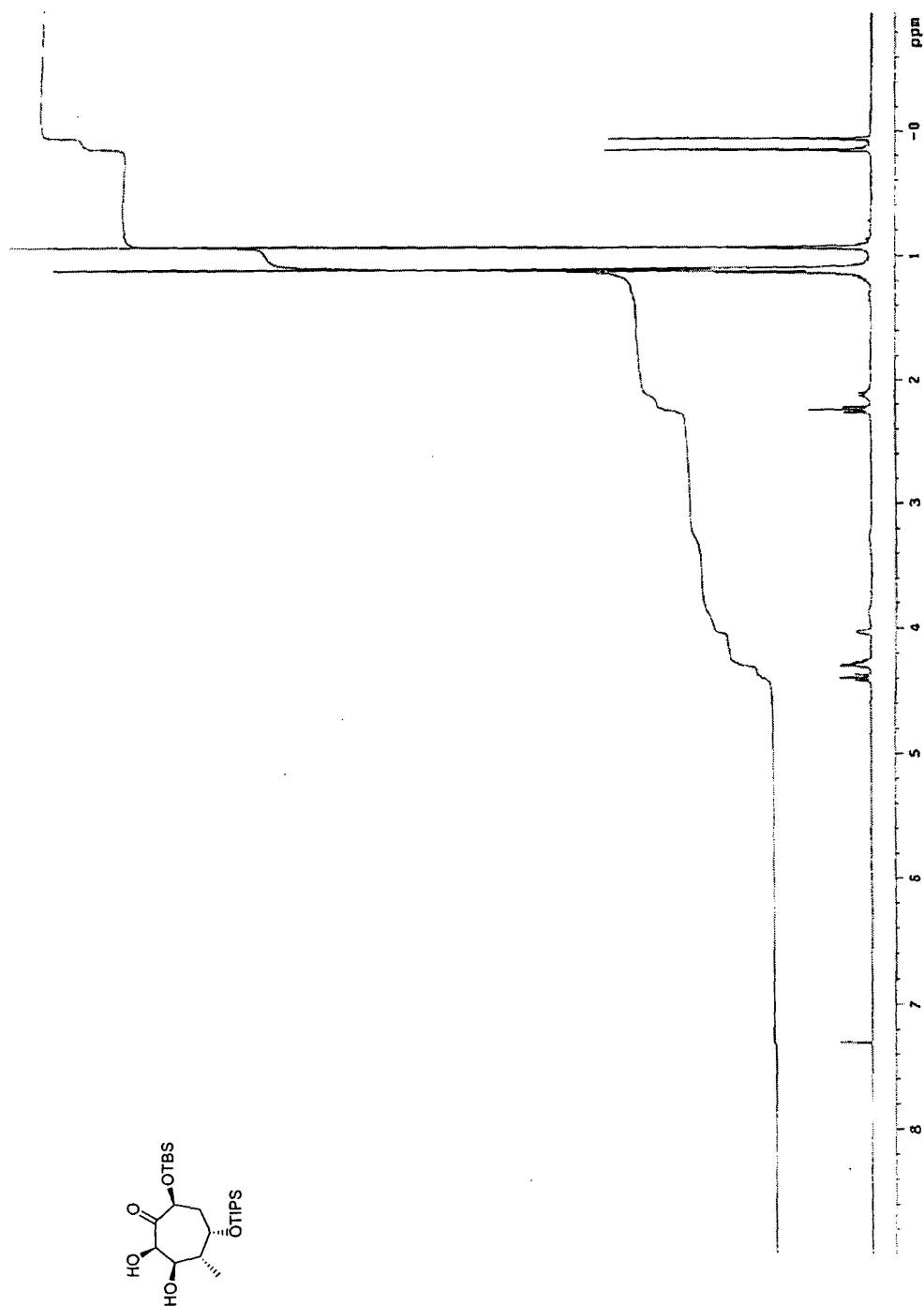
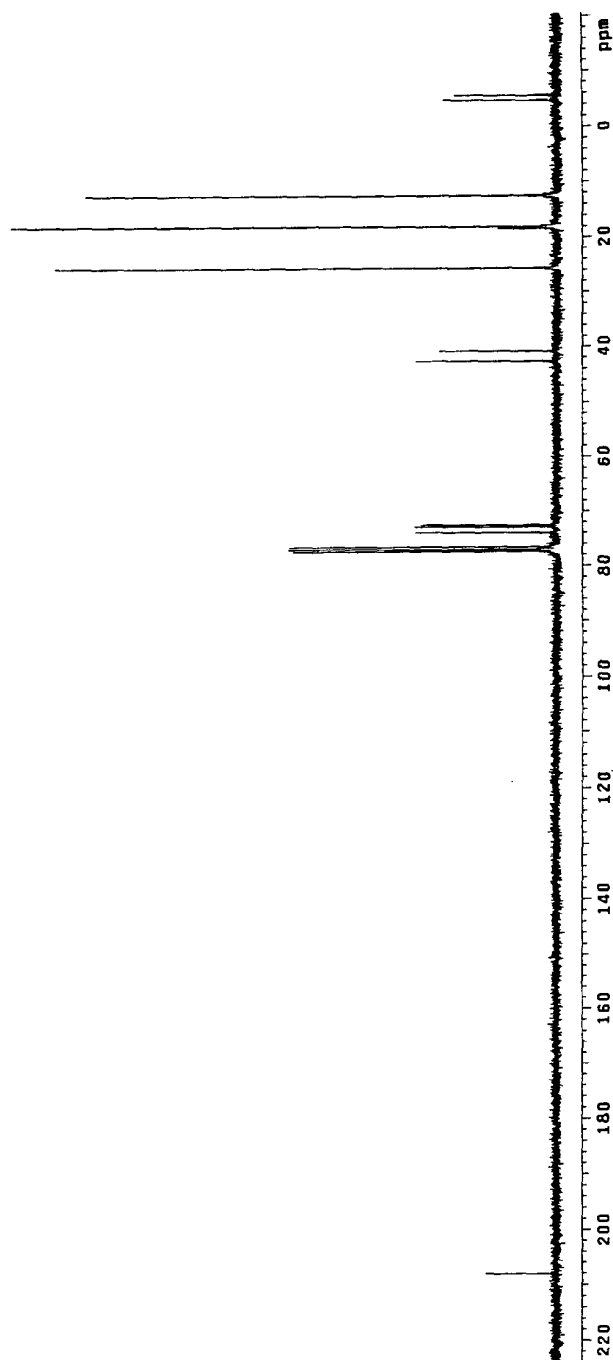
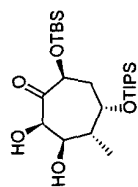
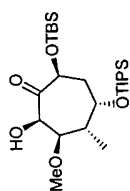
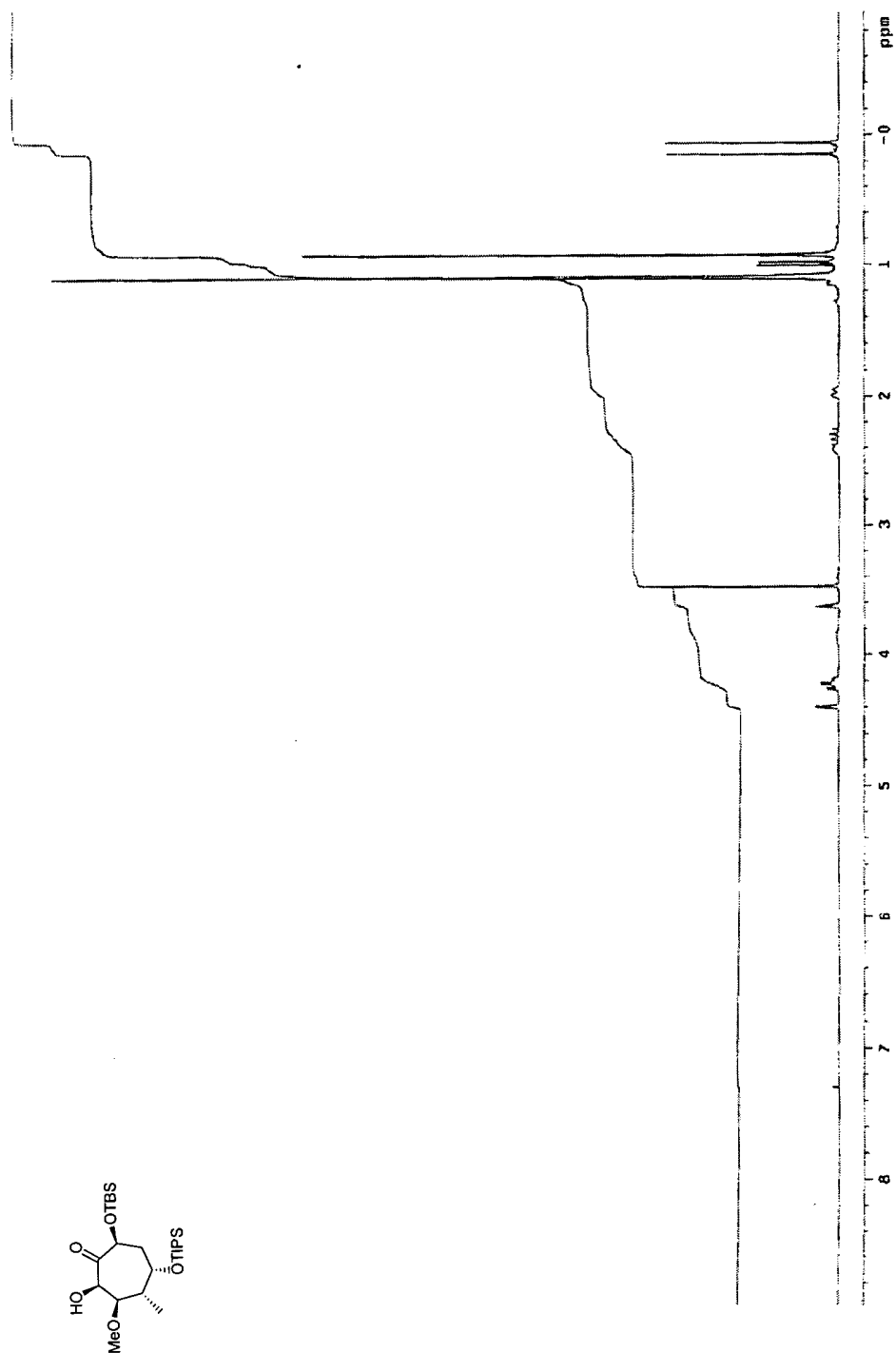


FIGURE 8 (Cont'd)



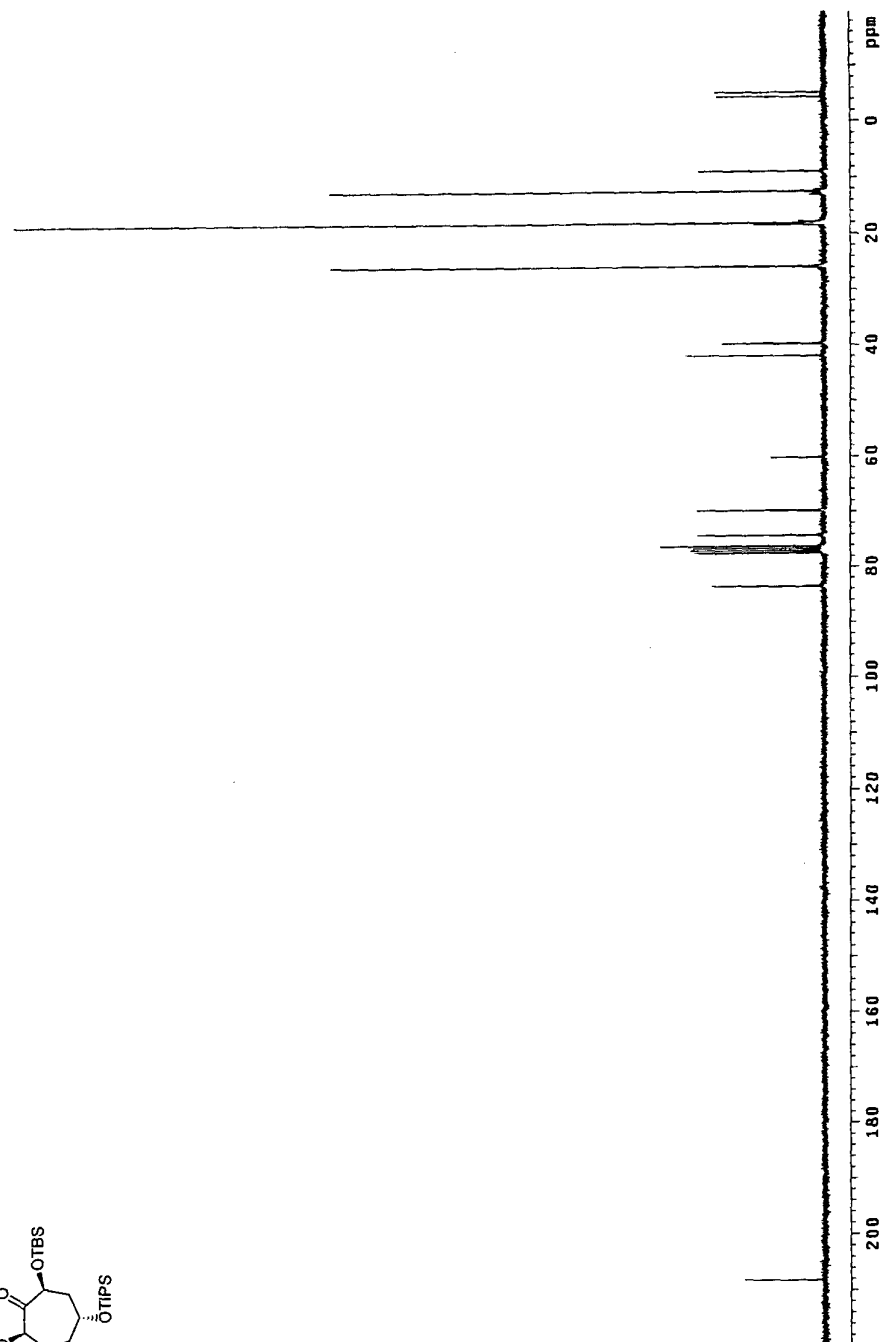
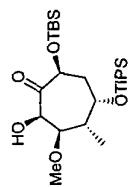
75MHz ^{13}C NMR of compound 46 in CDCl_3

FIGURE 8 (Cont'd)



300MHz ¹H NMR of compound 47 in CDCl₃

FIGURE 8 (Cont'd)



75MHz ^{13}C NMR of compound 47 in CDCl_3

FIGURE 8 (Cont'd)

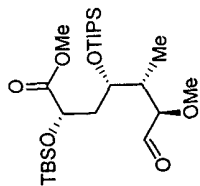
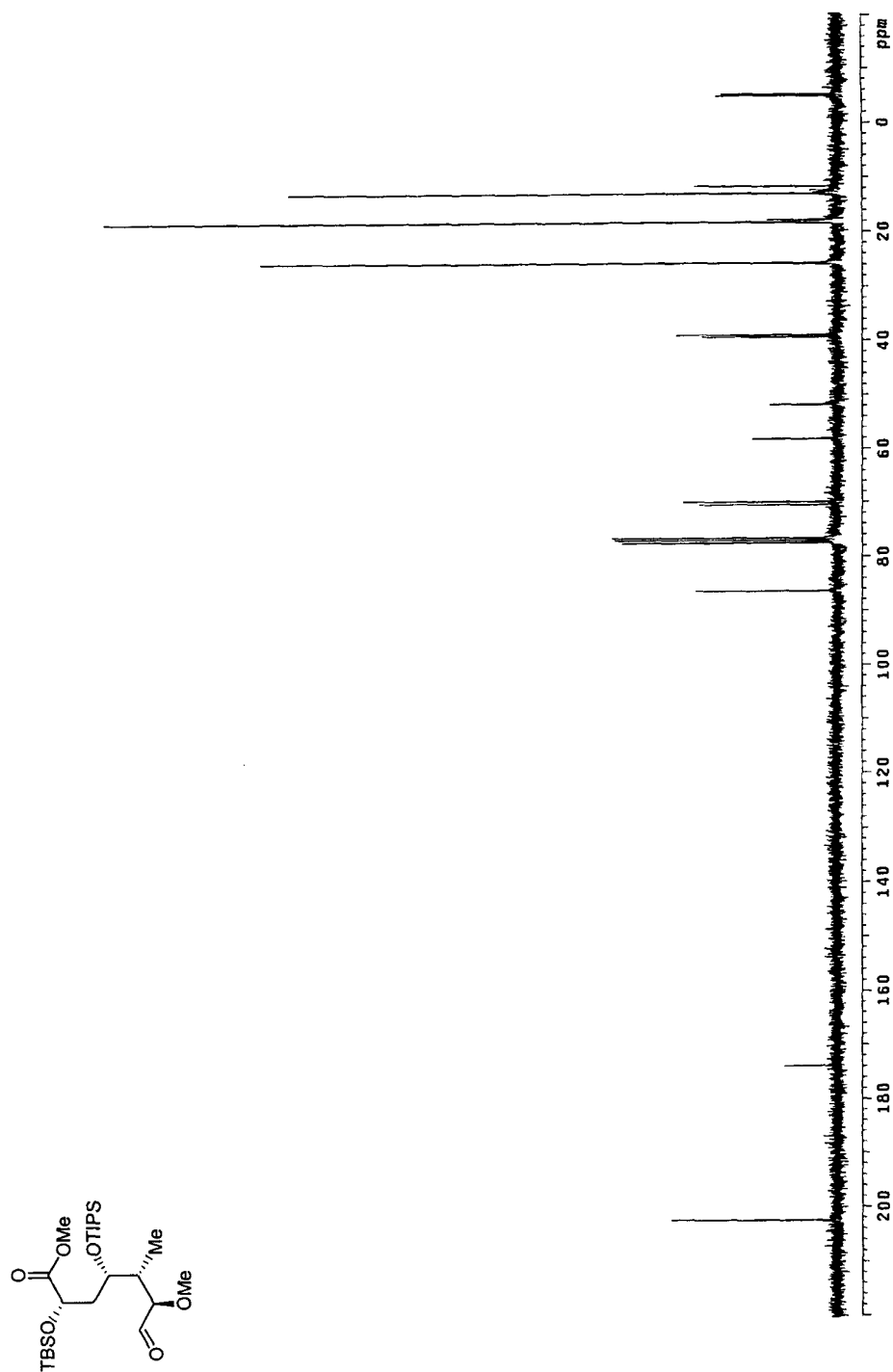
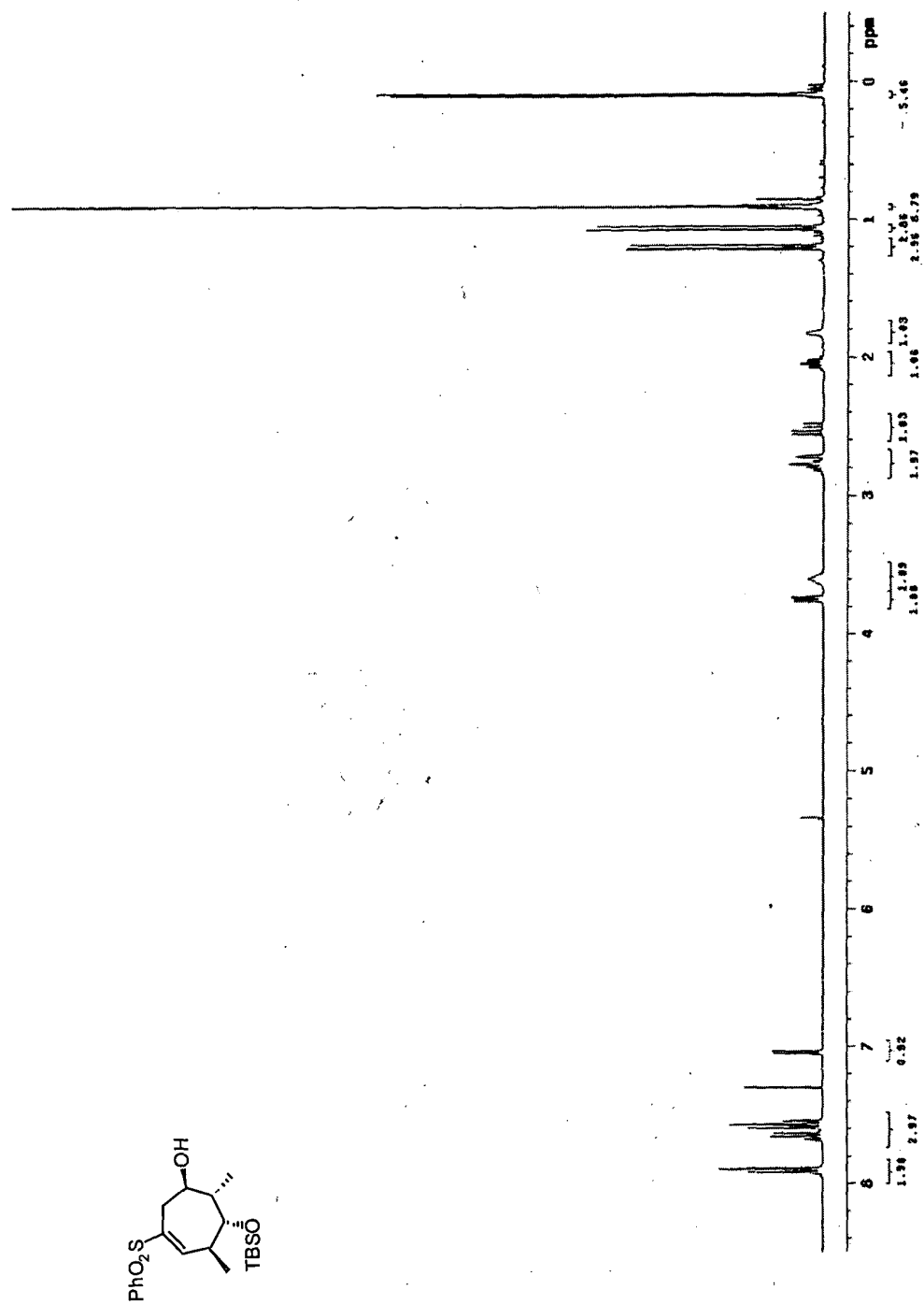
300MHz ¹H NMR of compound 48 in CDCl₃

FIGURE 8 (Cont'd)



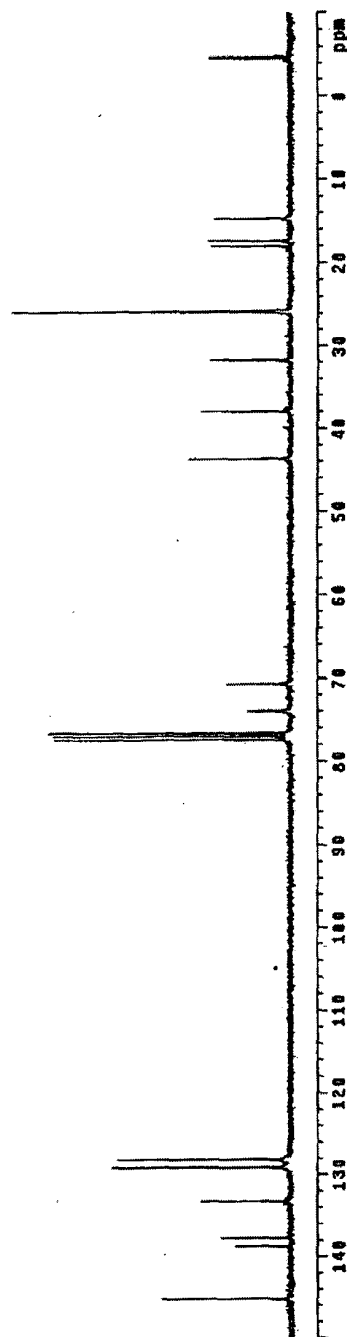
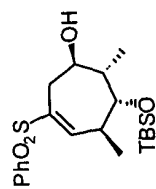
75MHz ^{13}C NMR of compound 48 in CDCl_3

FIGURE 8 (Cont'd)



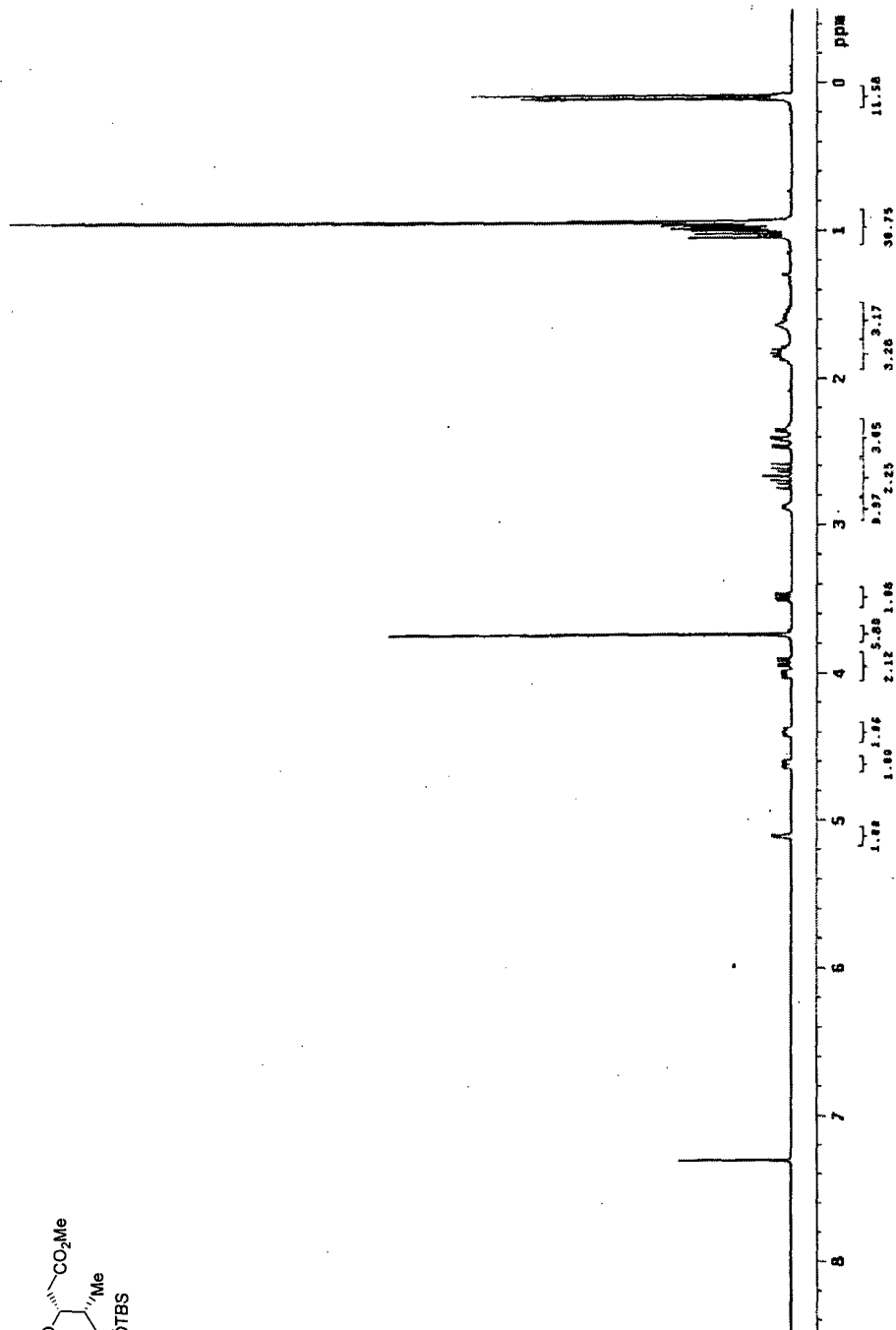
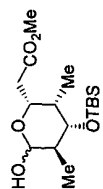
300MHz ^1H NMR of compound 56 in CDCl_3

FIGURE 8 (Cont'd)



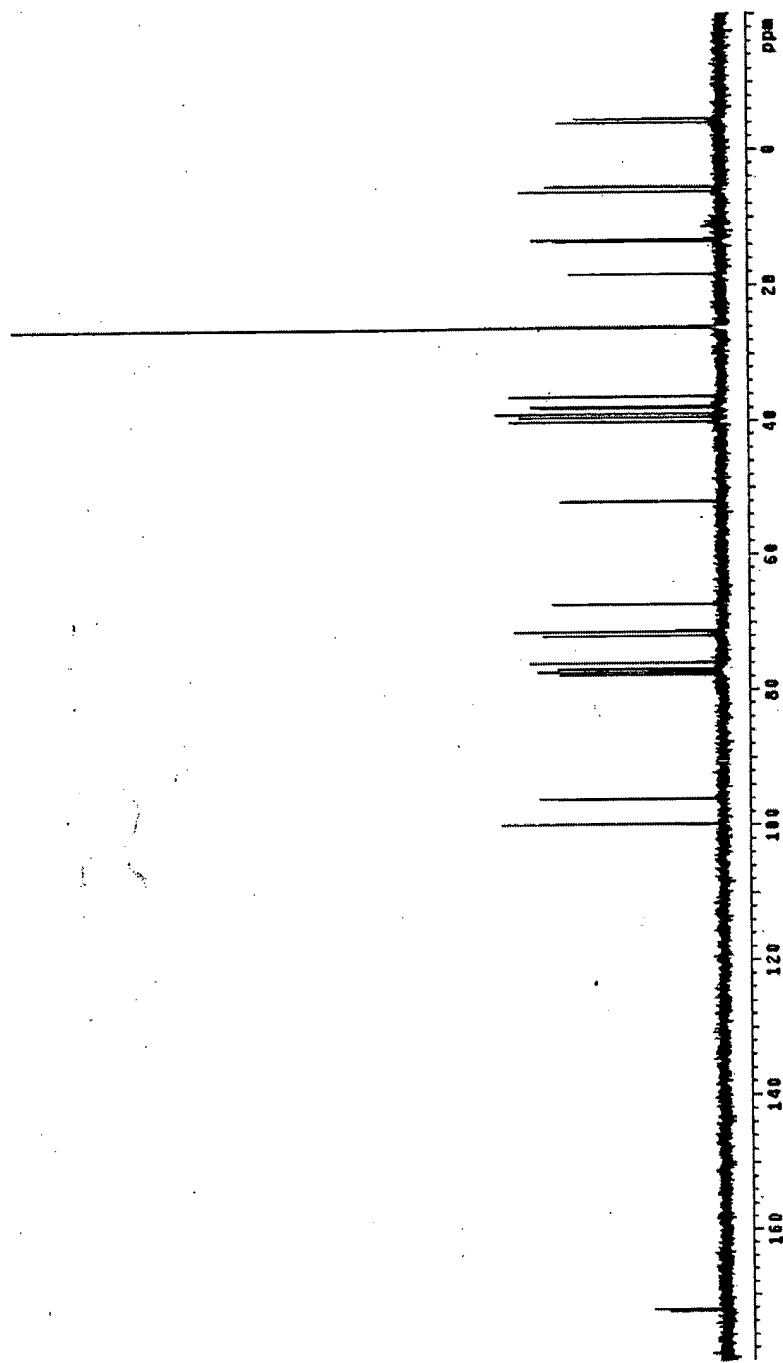
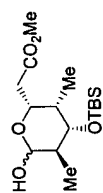
75MHz ^{13}C NMR of compound 56 in CDCl_3

FIGURE 8 (Cont'd)



300MHz ¹H NMR of compound 57 in CDCl₃

FIGURE 8 (Cont'd)



75MHz ¹³C NMR of compound 57 in CDCl₃

FIGURE 8 (Cont'd)

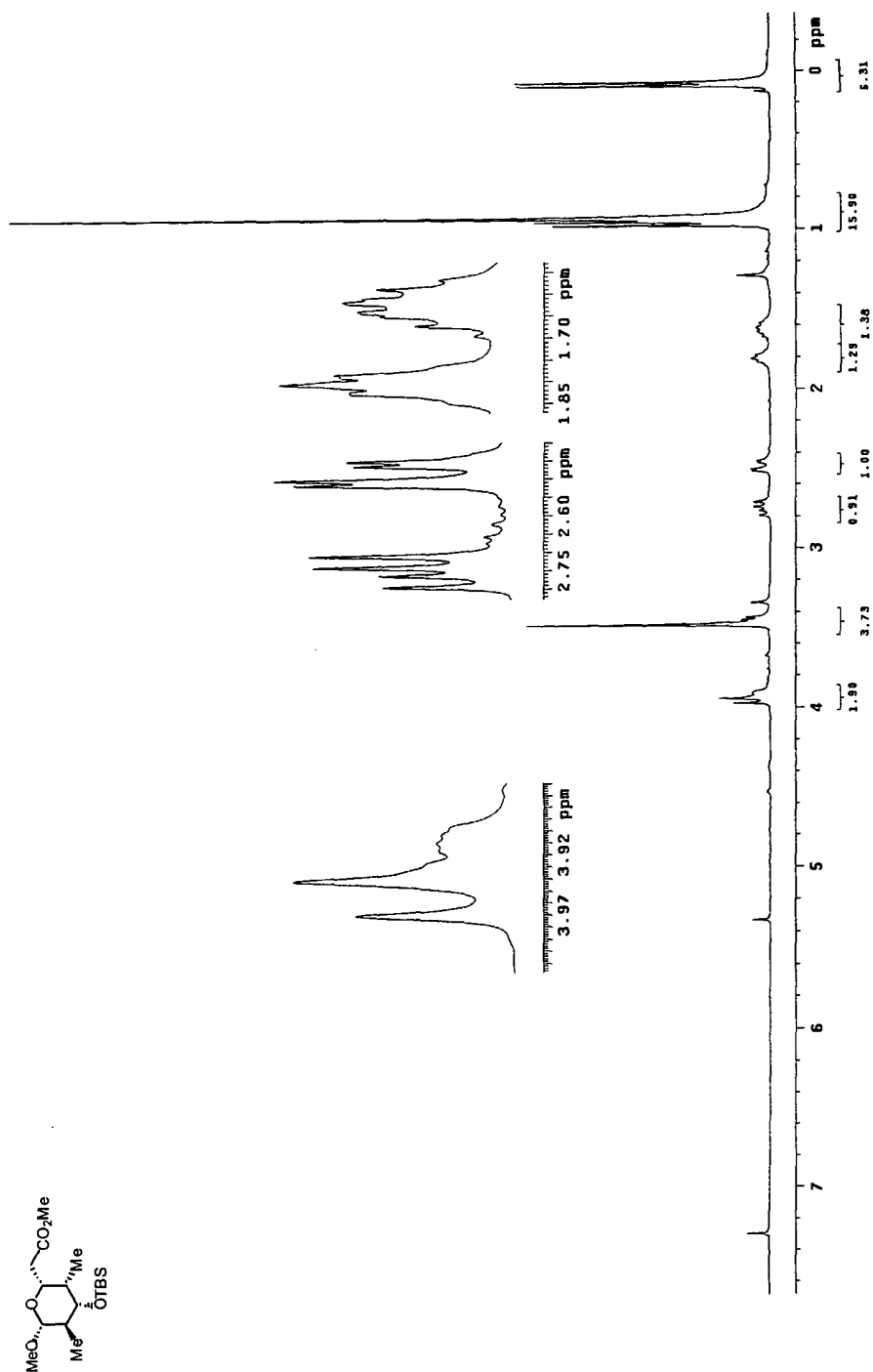
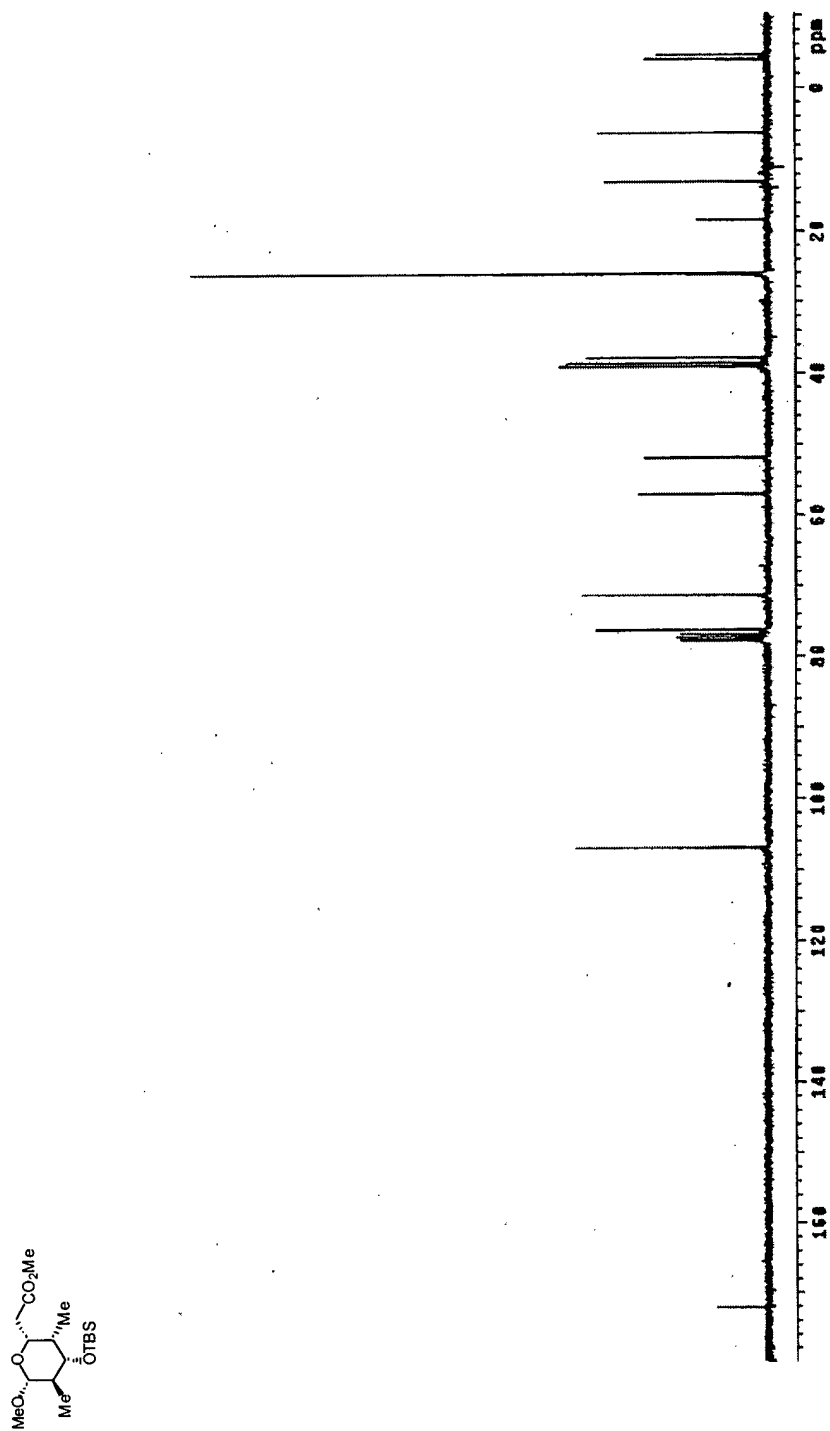


FIGURE 8 (Cont'd)



75MHz ^{13}C NMR of compound **58α** in CDCl_3

FIGURE 8 (Cont'd)

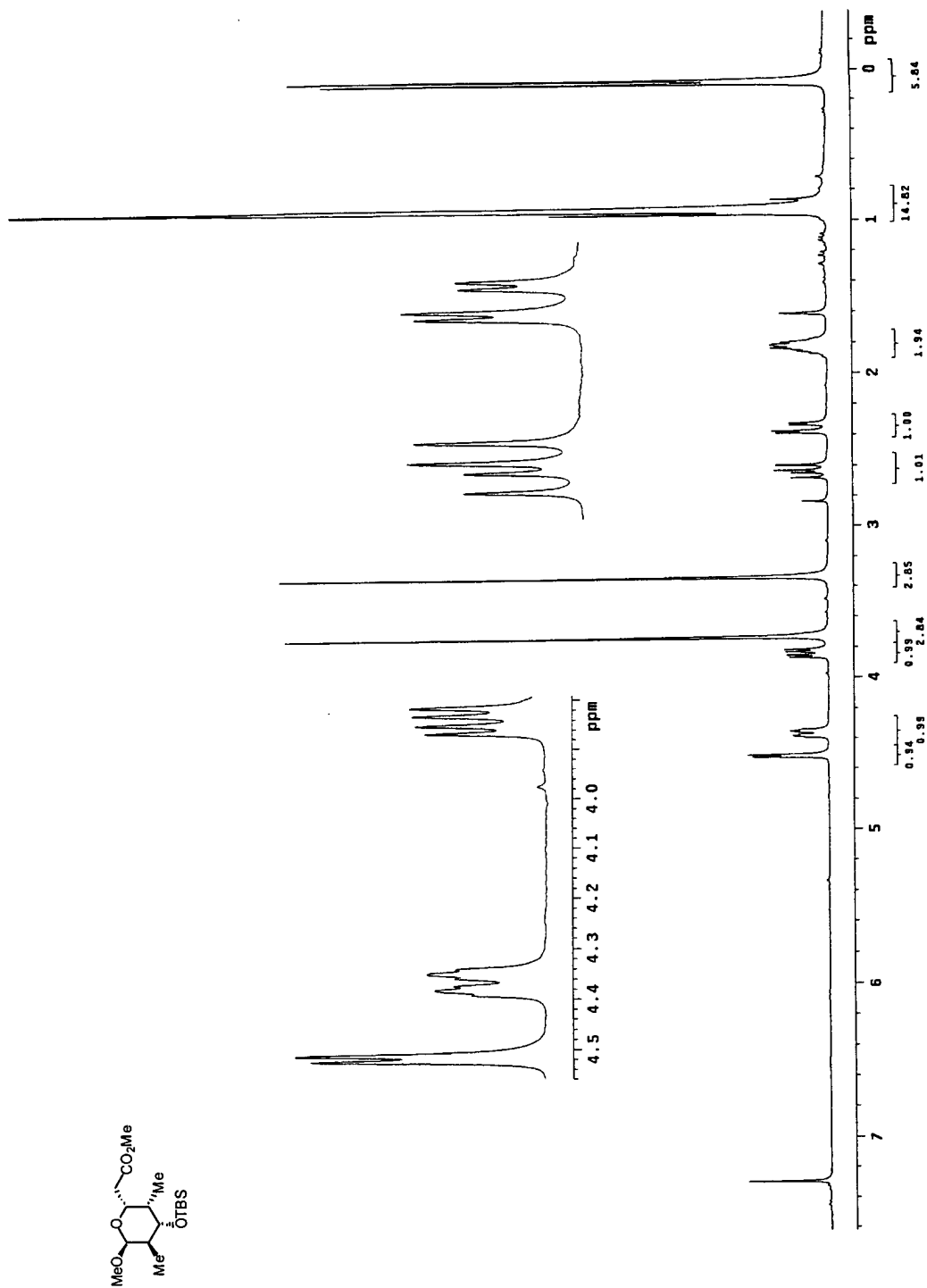
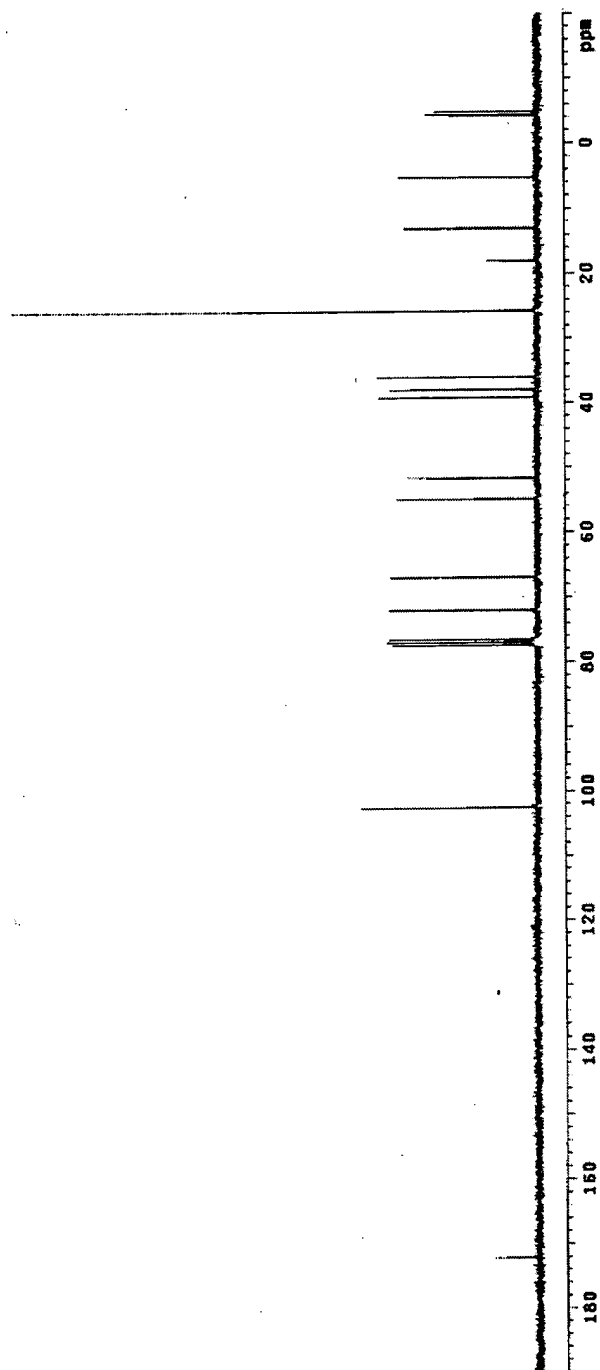
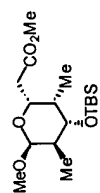
300MHz ¹H NMR of compound 58β in CDCl₃

FIGURE 8 (Cont'd)



75MHz ^{13}C NMR of compound 58 β in CDCl_3

FIGURE 8 (Cont'd)

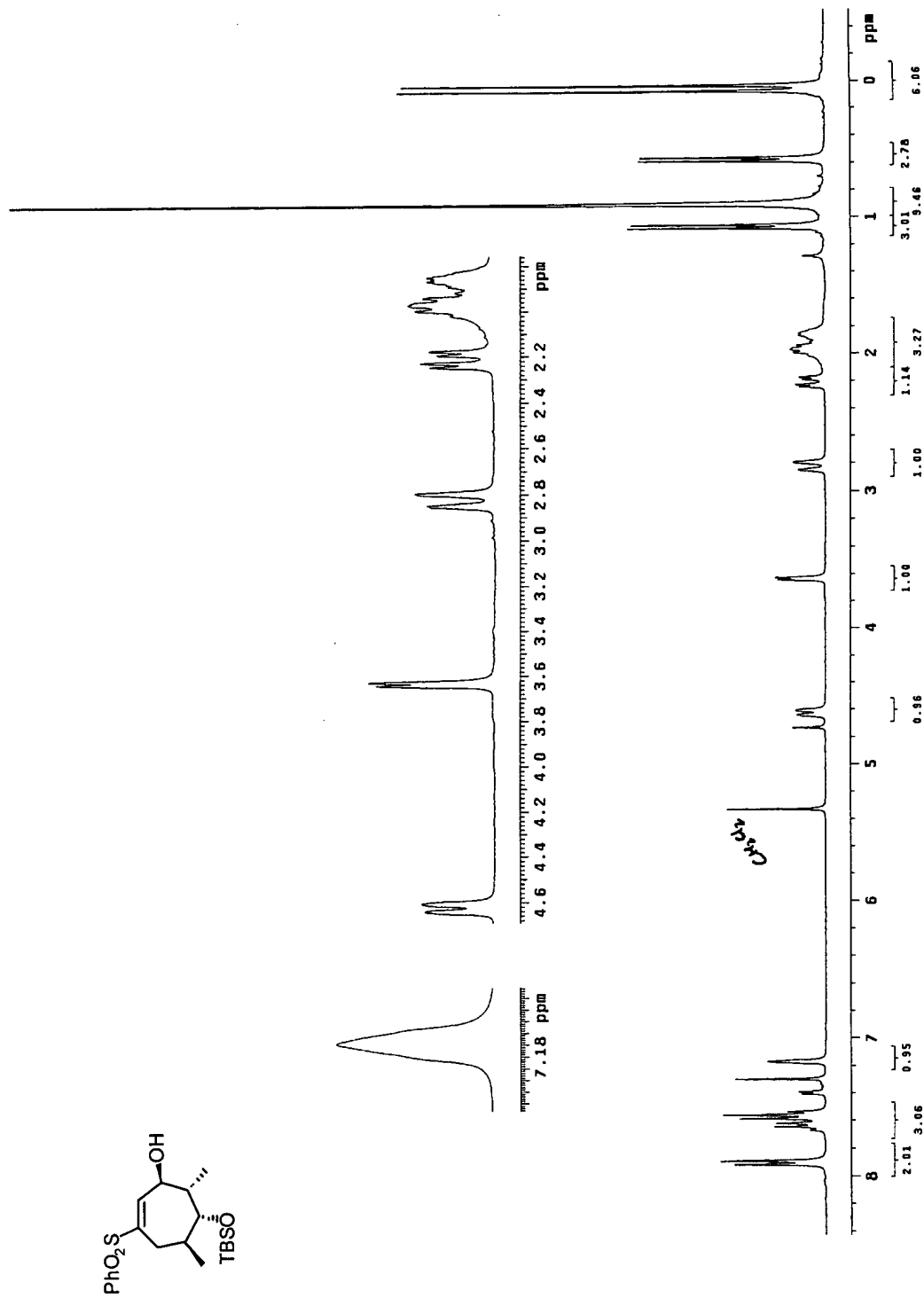
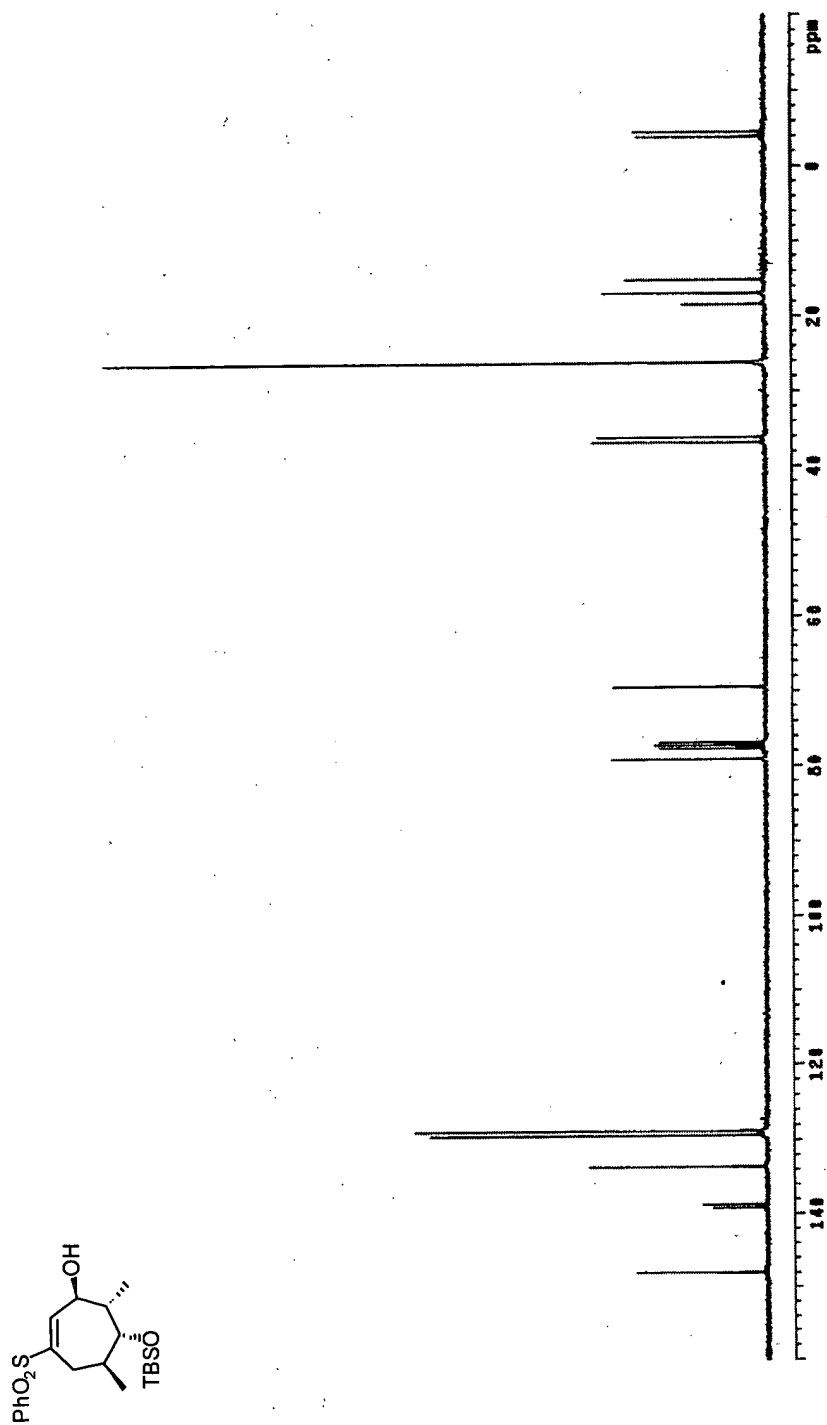
300MHz ¹H NMR of compound 59 in CDCl₃

FIGURE 8 (Cont'd)



75MHz ^{13}C NMR of compound 59 in CDCl_3

FIGURE 8 (Cont'd)

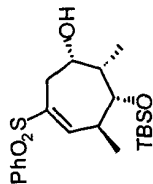
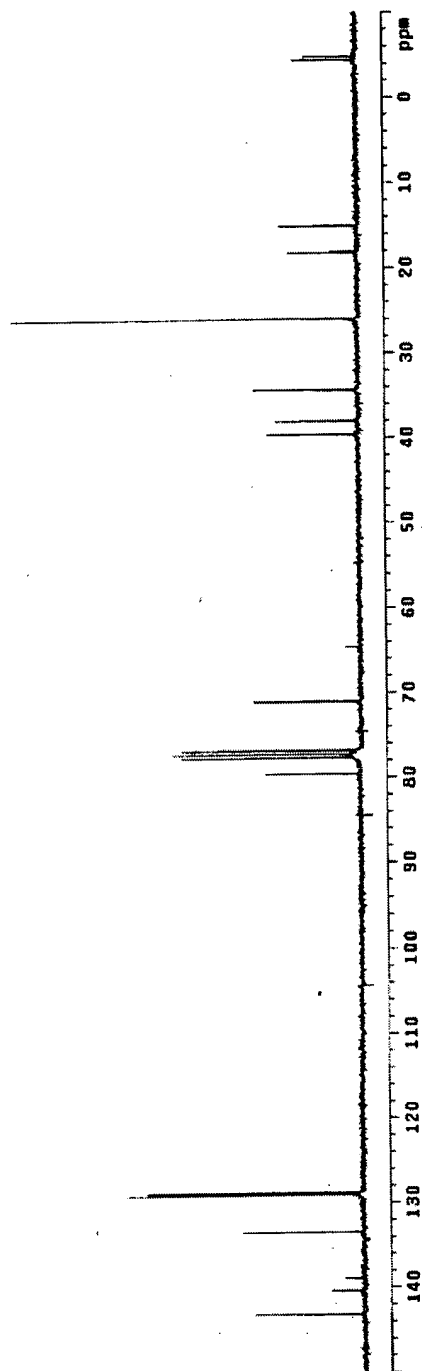
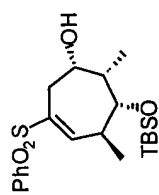
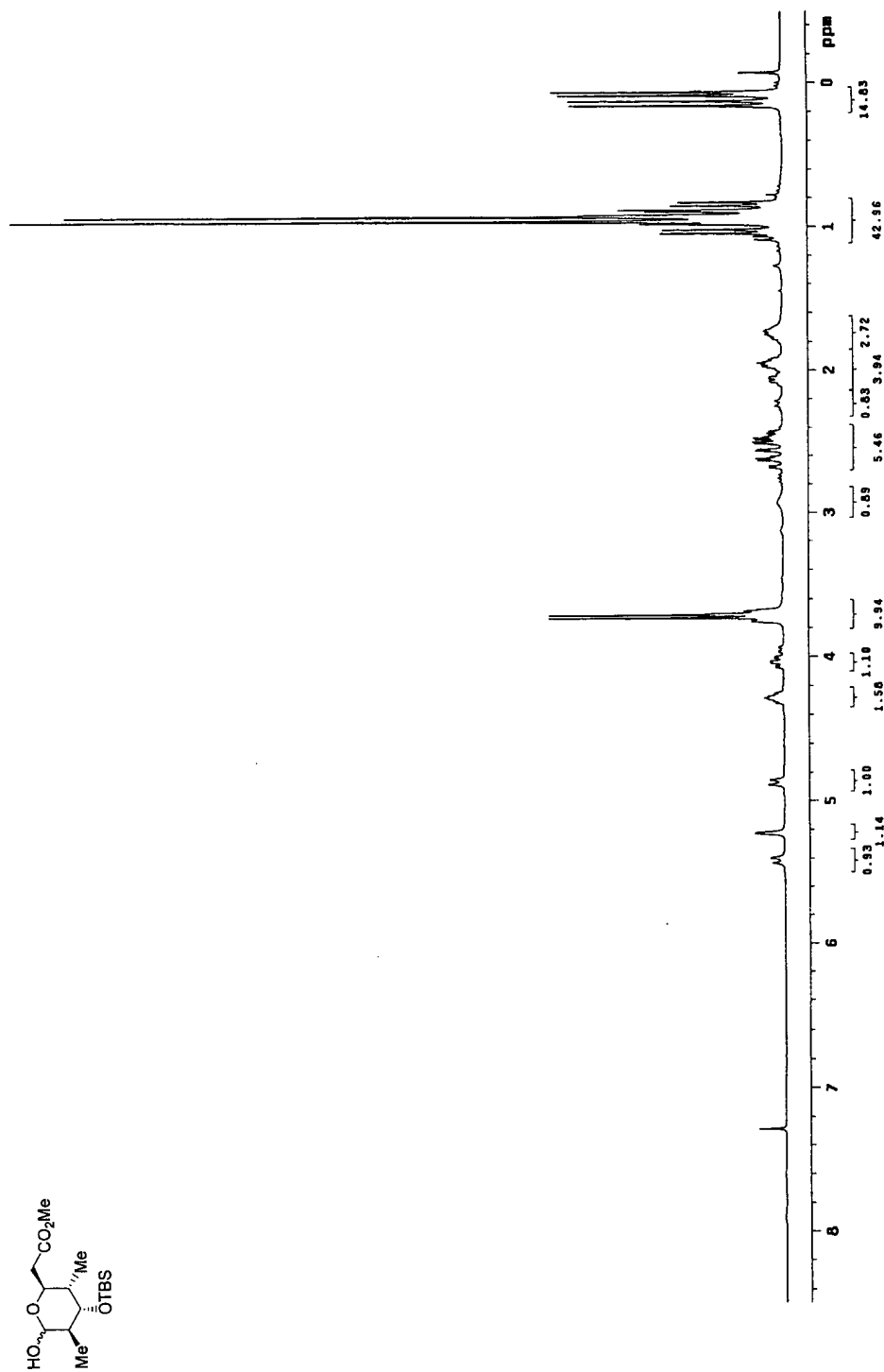
300MHz ¹H NMR of compound 60 in CDCl₃

FIGURE 8 (Cont'd)



75MHz ¹³C NMR of compound 60 in CDCl₃

FIGURE 8 (Cont'd)

300MHz ¹H NMR of compound 61 in CDCl₃

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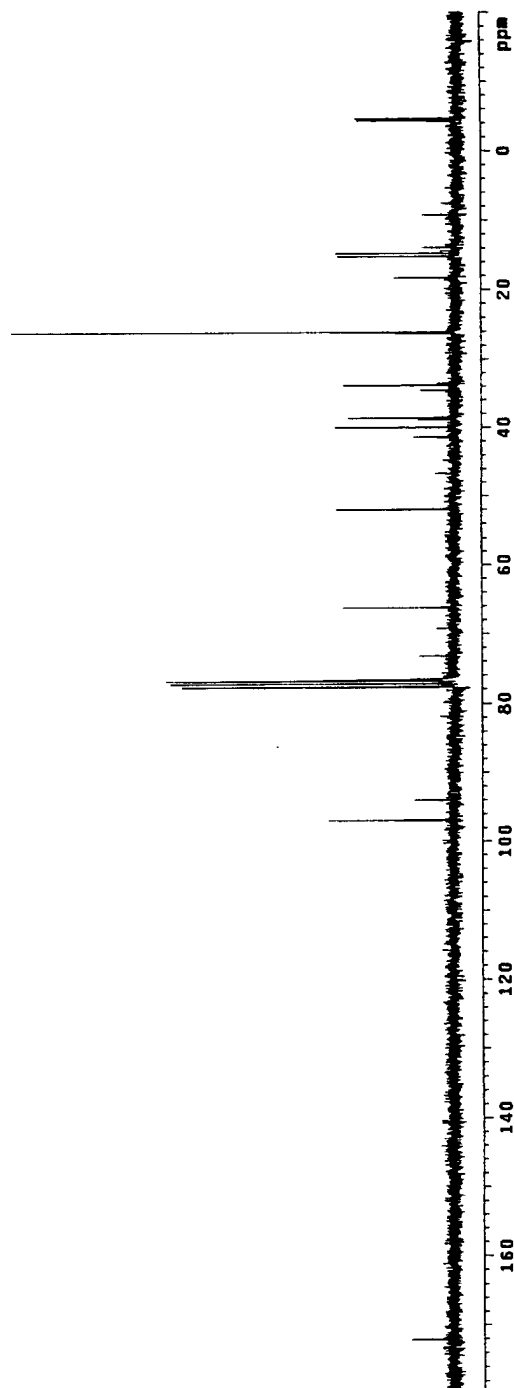
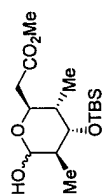
75MHz ^{13}C NMR of compound 61 in CDCl_3

FIGURE 8 (Cont'd)

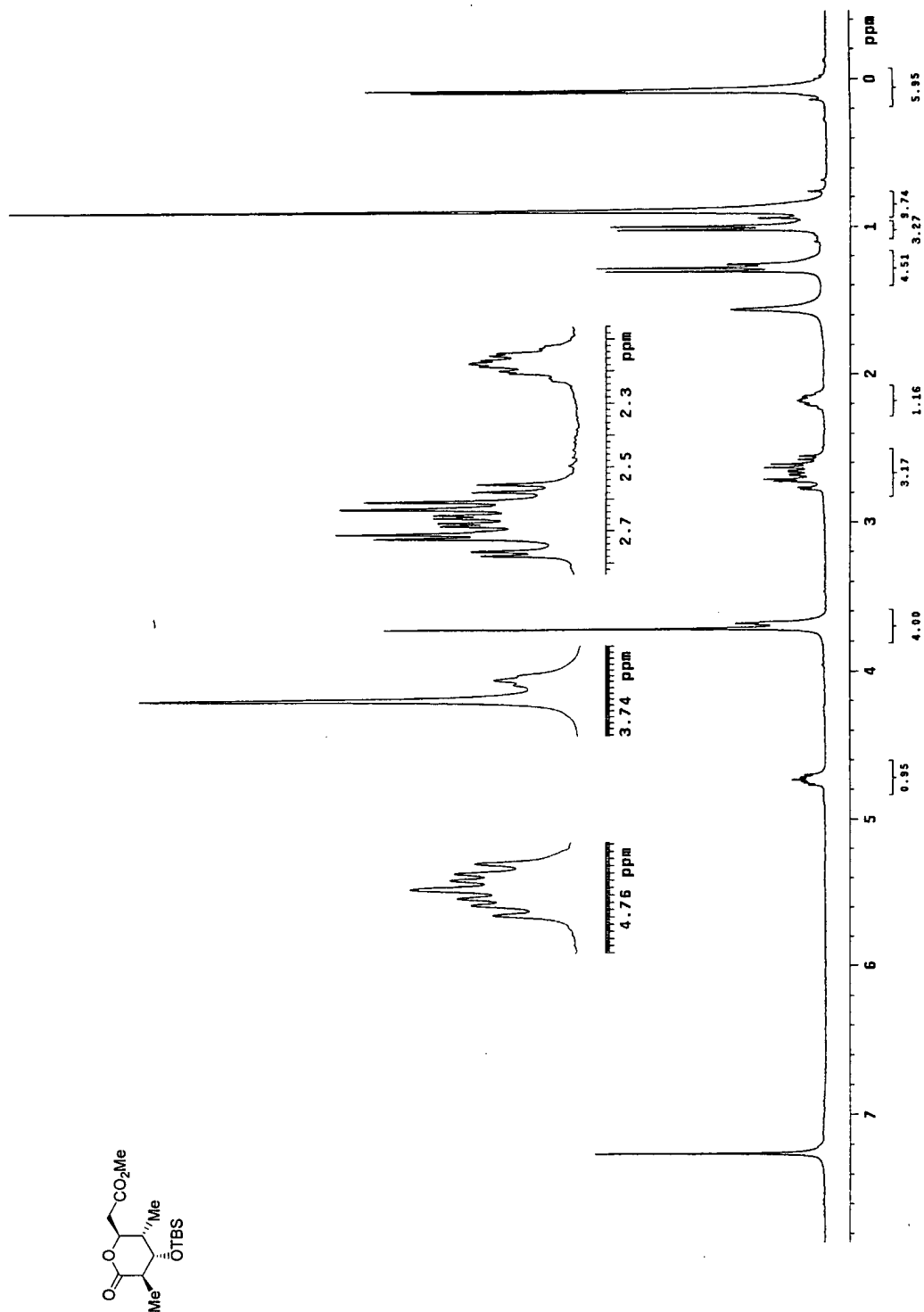
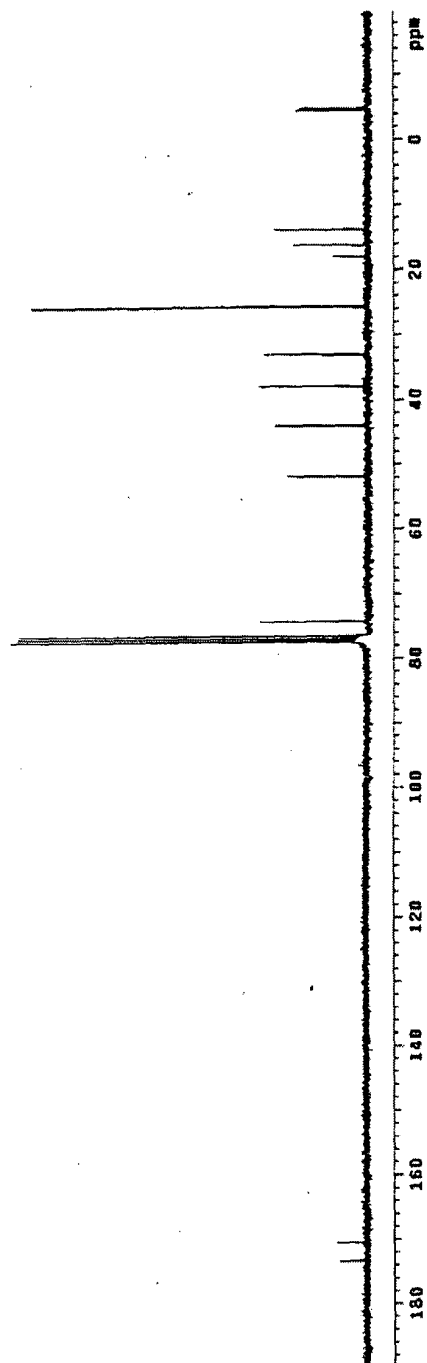
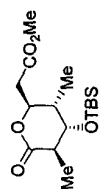


FIGURE 8 (Cont'd)



75MHz ^{13}C NMR of compound 62 in CDCl_3

of 1

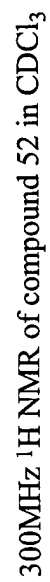
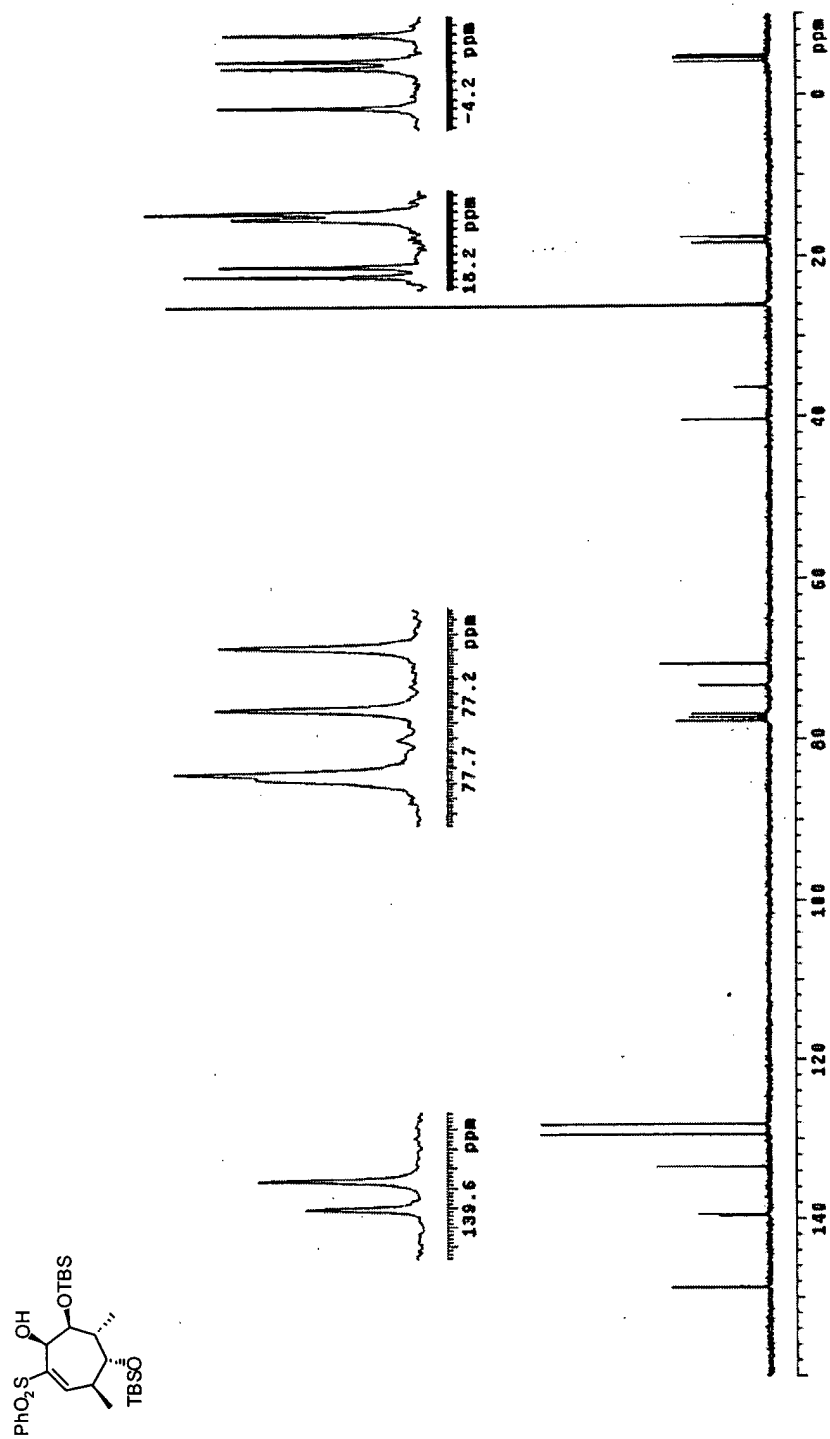
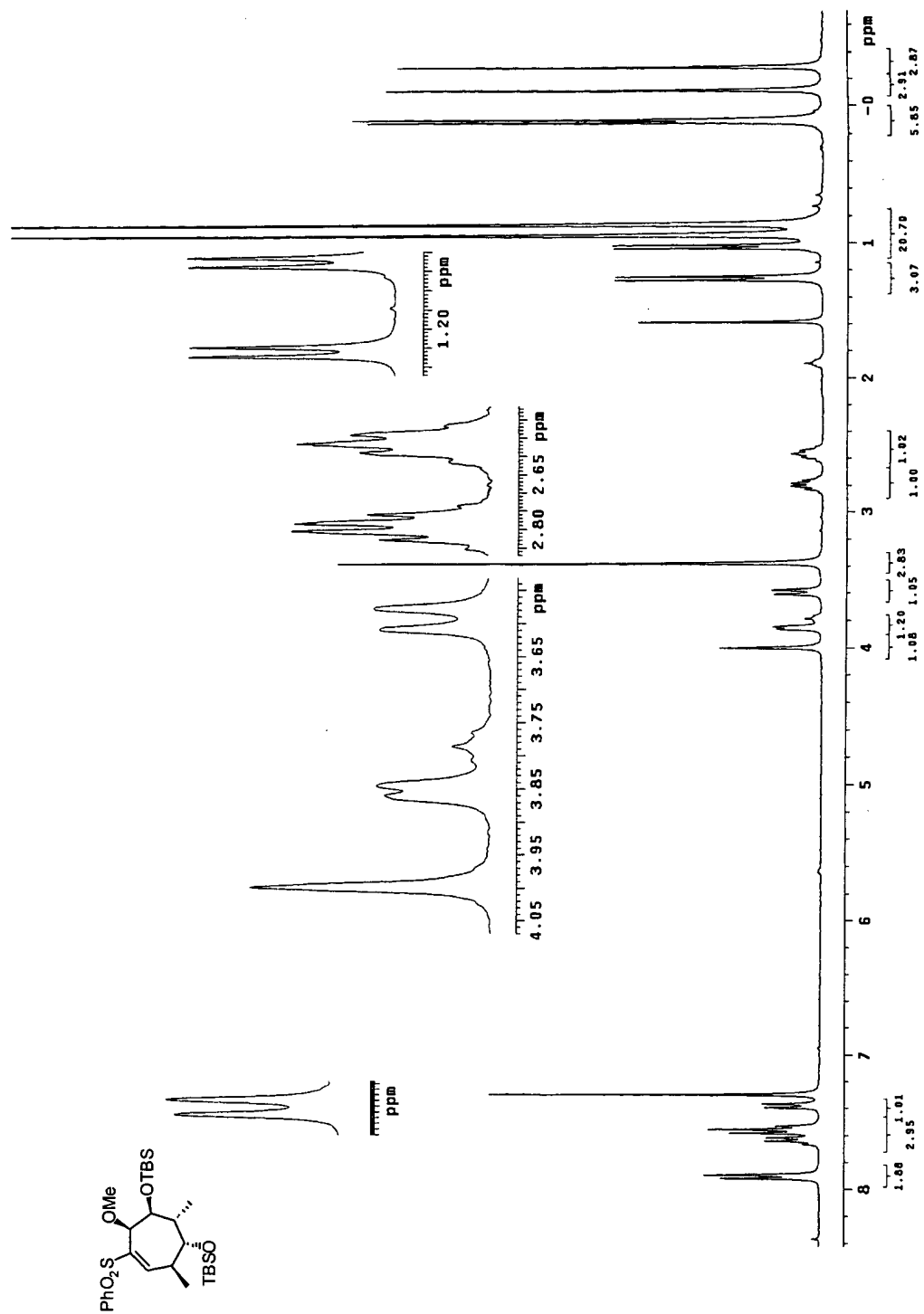
300MHz ¹H NMR of compound 52 in CDCl₃

FIGURE 8 (Cont'd)



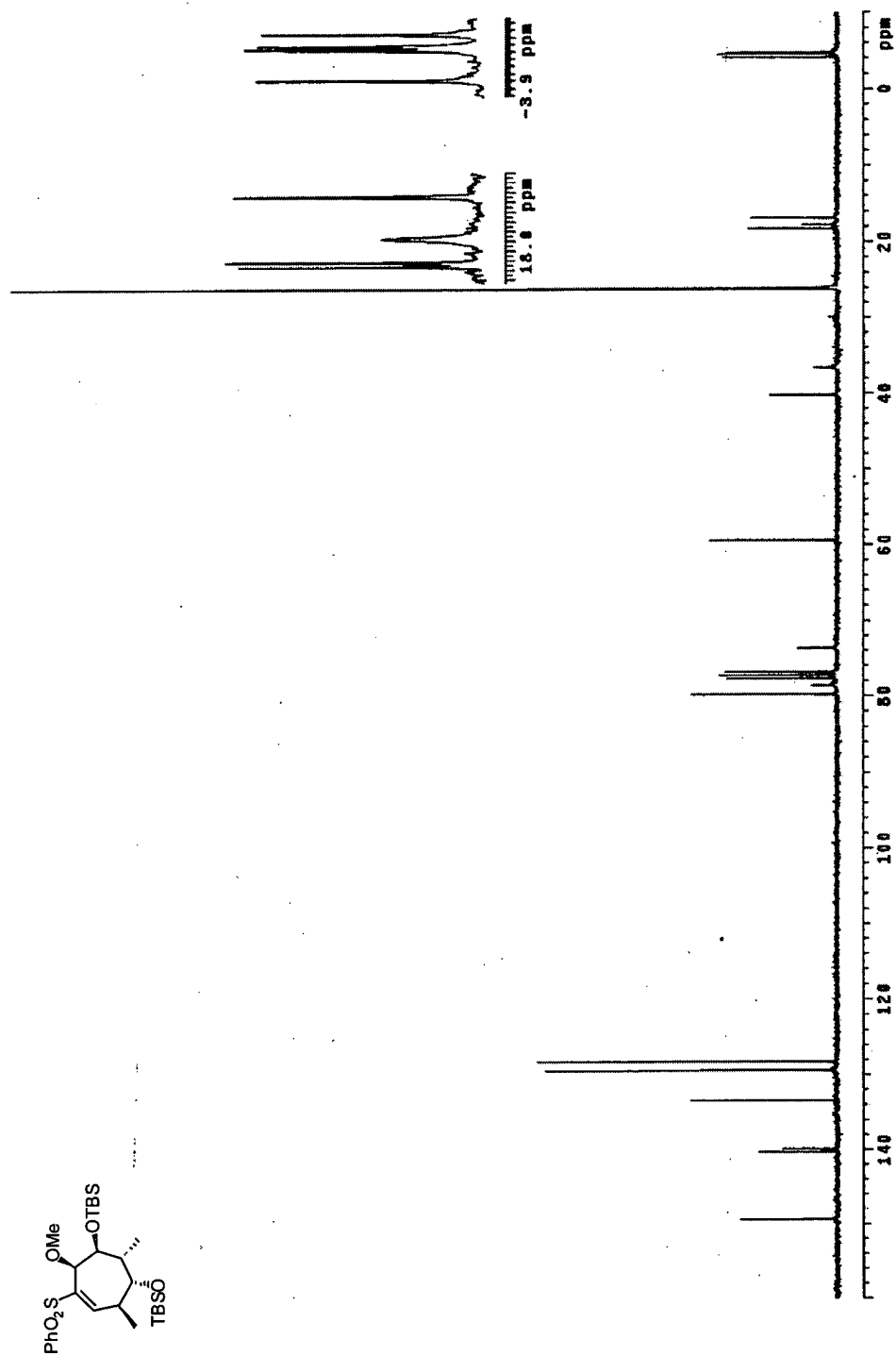
75MHz ^{13}C NMR of compound 52 in CDCl_3

FIGURE 8 (Cont'd)



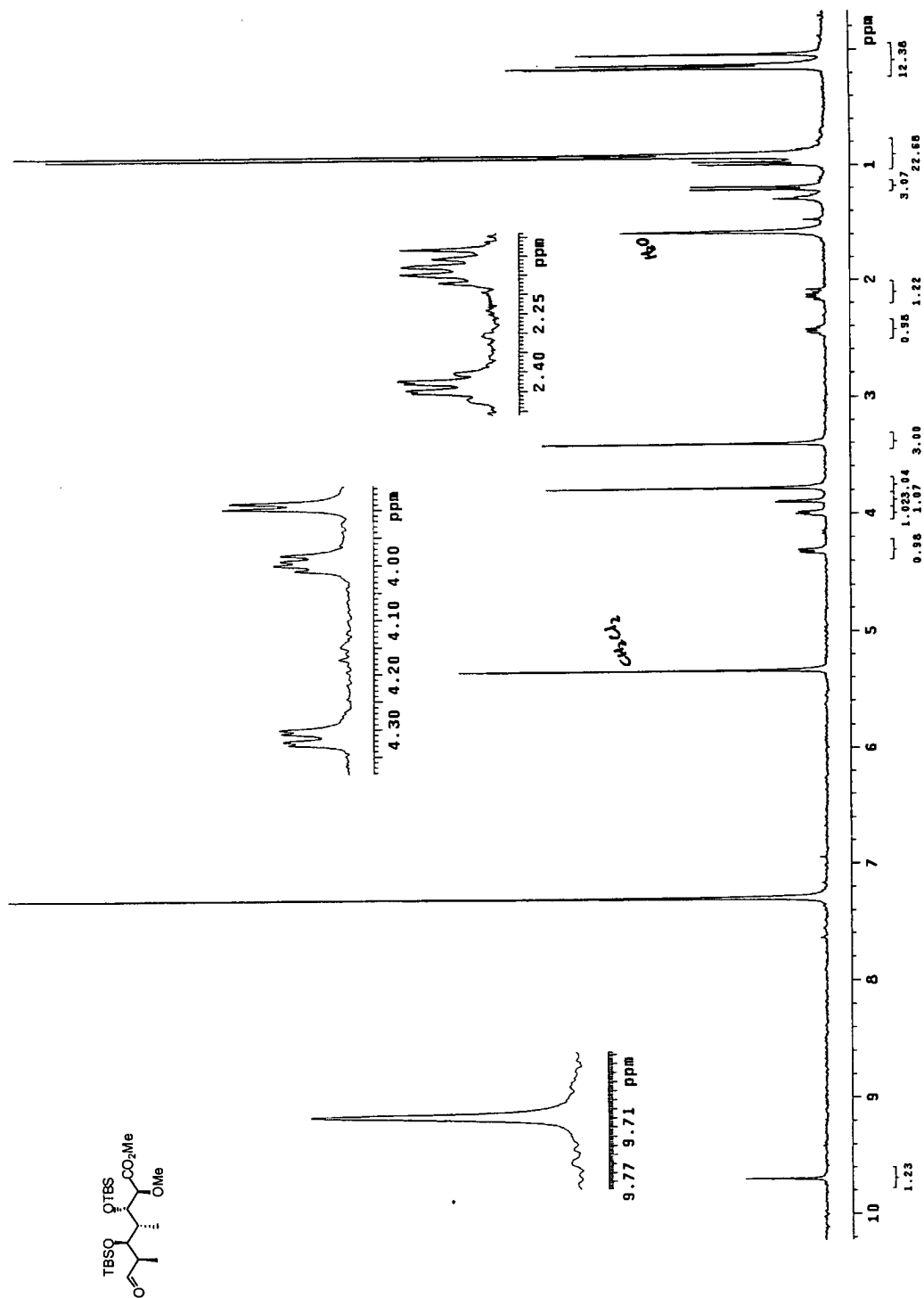
300MHz ¹H NMR of compound 53 in CDCl₃

FIGURE 8 (Cont'd)



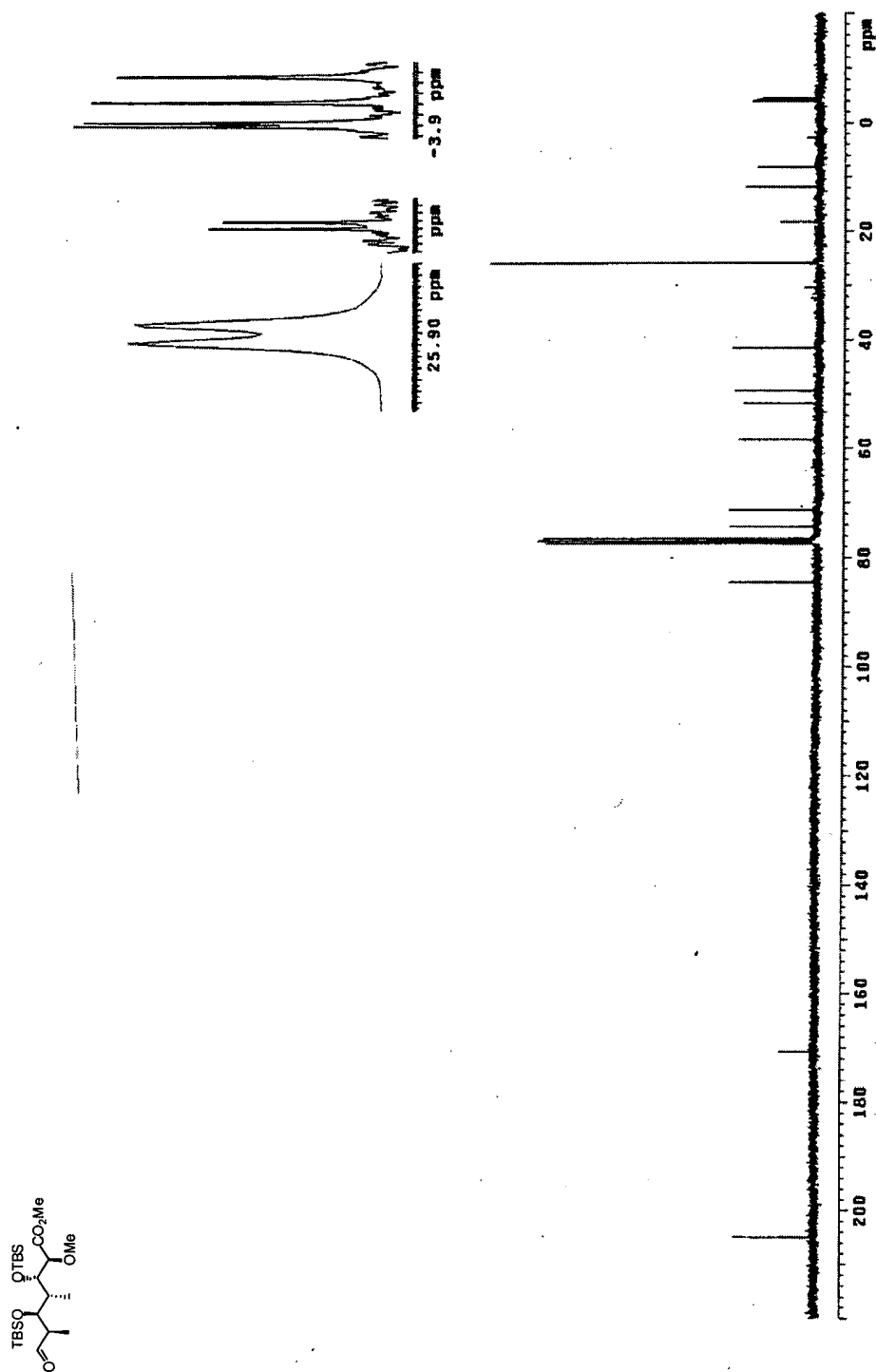
75MHz ^{13}C NMR of compound 53 in CDCl_3

FIGURE 8 (Cont'd)



300MHz ^1H NMR of compound 51 in CDCl_3

FIGURE 8 (Cont'd)

75MHz ^{13}C NMR of compound 51 in CDCl_3